Knowledge Management for the South African Department of Defence

Andries Petrus Putter

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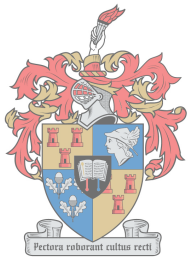

Supervisor: Dr Kula Ishmael Theletsane

Co-supervisor: Prof Johannes Lodewikus Jansen Van Rensburg

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DECLARATION

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ABSTRACT

The purpose of this research is to respond to the limited stock of knowledge about military Knowledge Management (KM) and specifically South African Department of Defence (SA DOD) KM. A world in the knowledge era, struggling with data/information saturation, requires KM as an advantage driver and multiplier. The SA DOD is still entrenched in the information era, practising information management as a primary enabler for decision-making, action, effects and advantage. The SA DOD does not seem interested in KM as a primary advantage driver.

The research problem and aim of this dissertation are to clarify the extent to which coherent and integrated KM will be beneficial to the SA DOD and what SA DOD KM fundamentals are. The research scope is inclusive of a broad literature review and documents analysis of both the published material on USA military KM and SA DOD legislation and policy, supplemented with questionnaires to a selected sample of SA DOD senior managers.

The researcher has a relativist worldview (ontological assumption), calibrated with a constructivist paradigm, favouring a qualitative research methodology and case study research approach/design that will render the rich description of the phenomenon using techniques such as questionnaires and document analysis. A deductive reasoning approach and case study research design was used to structure the research. Document analysis was the primary research method. The secondary research method was questionnaire data collection and analysis to provide insight into the level of interest in KM by the SA DOD and possibly supporting evidence to the findings of the document analysis. The combination of the research philosophy, methodology, design, and methods assisted the researcher in the quest to extract new meaning and propose new solutions for consideration by the SA DOD.

A universal definition void for knowledge and KM remains a practical challenge for organisations and a major obstacle to coherence and integration. Literature and business recognise the importance of KM as an advantage multiplier. Even military organisations such as the United States of America (USA) military recognise the importance if KM. The USA military is currently a military KM leader. In contrast, the SA DOD does not recognise the advent of the knowledge era and the importance of KM yet. The SA DOD's disinterest in KM is based principally on the analysis of legislative, policy and doctrine voids; leadership aspects; information era entrenchment; various levels of misunderstanding; KM policy and doctrine vacuum; and extensive construct dissonance. It is imperative that the SA DOD adopt knowledge era thinking and practice supporting survival and advantage. As a lead department in RSA securing national security, the SA DOD should lead the RSA government in a transition to the knowledge era and KM.

Knowledge and KM are fundamental to organisational survival, gaining and sustaining advantage and as enablers to decisions, actions and effects. Public service organisations', such as the SA DOD, KM motives are typically related to effectiveness and efficiency, economies and risk mitigation.

To cope with a world saturated by ubiquitous knowledge continuum artefacts, complexity, and discontinuous change; and fundamental to the decision, action, effect enablers and advantage -

a KM Capability (KMC) and coherent and integrated KM are recommended by this dissertation for the SA DOD (and probably the entire SA government).

SA DOD knowledge is defined by this dissertation as evolving meaning in the form of intellectual capital (IC) that capacitate understanding, decision-making, action, effect and advantage. SA DOD KM is defined by this dissertation as the integrated process transforming organisational IC into evolving meaning to capacitate understanding, decision-making, action, effect and advantage. These definitions are fundamental to a future SA DOD KMC and KM.

The dissertation proposes the expansion of KM to Knowledge Continuum Management; within the framework of acknowledging knowledge as a continuum and supporting the continuous requirement for integrated management of divergent approaches, processes and enablers. The dissertation argues for the review of current legislation and the Defence Review 2015 for alignment with the knowledge era. The dissertation argues further for coherent use of constructs such as leadership, IC, capstone military knowledge categories, types of SA DOD knowledge, KM leadership philosophy, and a knowledge continuum (amongst others). Recognition is required for the time-value of the knowledge continuum artefacts, discrepancies in SA DOD policy, doctrine and existing military capability expressions and knowledge security (amongst several others). This should illustrate the importance of knowledge and KM and to recommend possible solutions to a future SA DOD KMC and KM implementation.

Keyword search: Knowledge, knowledge management, military, South African Department of Defence, South African National Defence Force.

OPSOMMING

Hierdie navorsing reageer op die beperkte kennis oor militêre kennis bestuur (KB) en spesifiek SA Departement van Verdediging (DvV) KB. 'n Wêreld in die kennis-era, wat sukkel met data/inligting versadiging, vereis KB as 'n voorspong bestuurder en vermenigvuldiger. Die SA DvV is steeds in die inligtings-era vasgevang, en gebruik inligtingbestuur as die primêre grondslag vir besluitneming, aksie, effekte en voorspong. Dit will voorkom of die SA DvV nie geïnteresseerd is in KB as 'n primêre voorsprong drywer nie. Die doelwit van die verhandeling is om te verduidelik in watter mate samehangende en geïntegreerde KB voordelig sal wees vir die SA DvV en wat die SA DvV KB grondslae is. Kwalitatiewe navorsing en 'n induktiewe redenerings benadering, gevallestudies, dokument analise en vraelys metodes word saamgespan om nuwe betekenis te ontsluit.

Die navorser het 'n relativistiese wêreldbeskouing (ontologiese aanname), gekalibreer met 'n konstruktiwistiese paradigma (epistemologiese aanname), bevoordeel 'n kwalitatiewe navorsings metodologie en gevallestudie navorsingsbenadering / ontwerp wat a diep beskrywing van die verskynsel sal maak deur tegnieke soos vraelyste en dokumentanalise te gebruik. 'n Deduktiewe redeneringsbenadering en gevallestudie navorsings ontwerp is gebruik om die navorsing te struktureer. Dokument analise was die primêre navorsings metode. Die sekondêre navorsings metode was die invordering en analise van vraelyste om the vlak van belangstelling in KB the ondersoek and moontlike ander ondersteundnend opinieis te kry vir the bevindinge van die dokument analise. Die kombinasie van die navorsings filosofie, metodologie, ontwerp en metodes het die navorser bygestaan in die strewe om nuwe betekenis te verkry.

'n Universele definisie leemte vir kennis en KB bly 'n praktiese uitdaging vir organisasies en 'n vername struikelblok vir koherensie en integrasie. Literatuur en besighede erken die belangrikheid van KB as 'n voorspong vermenigvuldiger. Die VSA weermag is tans 'n KB leier. Die SA DvV herken tot vandag toe nog nie die koms van die kennis-era en die belangrikheid van KB nie. Die SA DvV blyk nie geintereseerd te wees in KB; hoofsaaklik gebaseer op die analise van wetgewende, beleids- en doktriene, leierskap aspekte; inligting-era verskansing; verskillende vlakke van misverstand; KB beleid en leerstelling vakuum; en uitgebreide konstruk dissonansie. Dit is noodsaaklik dat die SA DvV oorskakel na die kennis-era denkrigting en praktyke om oorlewing en voorsprong te ondersteun. As 'n RSA departementele leier vir die versekering van nasionale veiligheid, moet die SA DvV leiding verskaf vir die regering in die oorgang na die kennis-era en KB.

Kennis en KB is die grondslag vir organisatoriese oorlewing, die verkryging en handhawing van voorsprong en die grondslag vir besluite, aksies en effekte. Die motiewe vir KB deur openbare diens organisasies, soos die SA DvV, is tipies gerig op effektiwiteit, doeltreffendheid, bekostigbaarheid en risiko beperking. Samehangende en geïntegreerde KB en 'n KB Vermoë (KBV) word aanbeveel deur hierdie verhandeling as n basis vir SA DvV (en waarskynlik die hele SA regering) besluitneming, aksie, effekte en voorsprong - om te oorleef in 'n wêreld versadig deur alomteenwoordige kennis kontinuum artefakte, kompleksiteit en nie-aanhoudende verandering.

SA DvV kennis word deur hierdie verhandeling gedefinieer as evolueerende betekenis in die vorm van intellektuele kapitaal (IK) wat begrip, besluitneming, aksie, effek en voorsprong

bevorder. SA DvV KB word deur hierdie verhandeling gedefinieer as die geïntegreerde proses wat organisatoriese IK omskep in evoleerende betekenis om begrip, besluitneming, aksie, effek en voorspong te bevorder. Hierdie definisies is die grondslag vir 'n toekomstige SA DOD KMV en KB.

Hierdie verhandeling stel die uitbreiding van KB tot Kennis Kontinuum Bestuur voor; binne die raamwerk van die erkenning van kennis as 'n kontinuum en ondersteuning van die voortdurende vereiste vir geintegreerde bestuur van uiteenlopende benaderings, prosesse en enablers. Die verhandeling beredeneer vir die hersiening van huidige wetgewing en die Verdedigings Oorsig 2015 om dit te rig op die kennis-era. Verder, die verhandeling beredeneer vir die samehangende gebruik van konstrukte soos leierskaps IK, hoeksteen-militêre kennis kategorieë, tipes SA DvV kennis, KB leierskap filosofie, en 'n kennis kontinuum; onder andere. Daar is ‘n vereiste vir die erkenning van die tydwaarde van kennis kontinuum artefakte, die teenstrydighede in SA DvV beleid, doktriene en bestaande militêre vermoë uitdrukkings, en kennis sekuriteit (onder verskeie ander) om die belangrikheid van kennis en KB te illustreer en moontlike oplossings aan te beveel vir 'n toekomstige SA DvV KBV en KB inwerkingstelling.

Sleutelwoord soektog: Kennis, kennisbestuur, militêre, Suid-Afrikaanse Departement van Verdediging, Suid-Afrikaanse Nasionale Weermag.

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ARMSCOR	Armament Corporation of South Africa
AKM	Army Knowledge Management
C2	Command and Control
C2W	Command and Control Warfare
C^4IKRS	Command, Control, Communications, Computers, Infrastructure, Knowledge, Reconnaissance and Surveillance
C^4I^3RS	Command, Control, Communications, Computers, Intelligence, Information, Infrastructure, Reconnaissance and Surveillance
C CMIS	Chief Command Management Information Systems
C DI	Chief Defence Intelligence
CIO	Chief Information Officer
C JOPS	Chief of Joint Operations
CKO	Chief Knowledge Officer
CMIS	Command Management Information Systems
Corp Com	(South African) Corporate Communications
C SANDF	Chief of the South African National Defence Force
CSF	Critical Success Factor
CSIR	Council for Scientific and Industrial Research
DEIS	Defence Enterprise Information System
DEISM	Defence Enterprise Information System Master Plan
DICI	Defence Information & Communication Infrastructure
DIMES	Diplomatic, Information, Military, Economic, Social
DOD	Department of Defence
DODD	(South African) Department of Defence Directive
DODI	(South African) Department of Defence Instruction
DODSPF	(South African) Department of Defence Strategic Planning Framework
DR	Defence Review
ELINT	Electronic Intelligence
ETD	Education, Training and Development
EW	Electronic Warfare
FM	Field Manual
FMDI	(South Africa) Financial Management Division Instructions
FMKM	Financial Management Knowledge Management
GCIS	Government Communications and Information Systems
HRM	Human Resource Management
IA	Intangible Asset
IntBW	Intelligence Based Warfare
InfoBW	Information-based Warfare
IC	Intellectual Capital
ICT	Information and Communication Technology
ICS	Information Communication System
IDODI	(South African) Interim Department of Defence Instruction

IIW	Infrastructure Warfare
IM	Information Management
InfoOps	Information Operations
IntOps	Intelligence Operations
IP	Intellectual Property
ISME	Integrated Strategic Management Enabler
ISR	Intelligence, Surveillance and Reconnaissance
ISSO	Information and Communications Systems Security Officer/Official
IT	Information Technology
IW	Information Warfare
JDP	(South African) Joint Defence Publication
JI2M	Joint, Inter-agency, Interdepartmental and multinational
JOA	Joint Operations Area
JWM	(South African) Joint Warfare Manual
JWP	(South African) Joint Warfare Publications
KCM	Knowledge Continuum Management
KM	Knowledge Management
KMC	Knowledge Management Capability
KMI	Knowledge Management Institute
KMS	Knowledge Management System
KOps	Knowledge Operations
KW	Knowledge Warfare
MIS	Management Information Systems
MISS	Minimum Information Security Standards
MOD	Minister of Defence
MODD	Minister of Defence Directive
MSIAC	Munitions Safety Information Analysis Centre
MTEF	Medium Term Expenditure Framework
MTSF	Medium Term Strategic Framework
NASAA	National Archives of South Africa Act
NSIA	National Strategic Intelligence Act
NW	Network Warfare
OECD	Organisation for Economic Co-operation and Development
OODA	Observe, Orientate, Decide, Act
PAIA	Promotion of Access to Information Act
PERSOL	Personnel and Soldy
PFMA	Public Finance Management Act
POIA	Protection of Information Act
POSTEDFIT	Personnel, Organisation, Strategy, Training, Equipment, Doctrine, Facilities, Information and Technology
POSTEDFIT	Personnel, Organisation, Strategy, Training, Equipment, Doctrine, Facilities, Intelligence and Technology
POSTEDFIT	Personnel, Organisation, Strategy, Training, Equipment, Doctrine, Facilities, Information Technology and Technology
POSTEDFIT(B)	Personnel, Organisation, Strategy, Training, Equipment, Doctrine,

	Facilities, Information, Technology and Budget
PSO	Peace Support Operations
PsyOps	Psychological Operations
PW	Psychological Warfare
RMA	Revolution in Military Affairs
RSA	Republic of South Africa
SA	South Africa
SA DOD	South African Department of Defence
SADC	South African Development Community
SAMATT	South African Military Assistance and Training Teams
SANDF	South African National Defence Force
SANDFD	(South African) South African National Defence Force Directive
SANDFO	(South African) South African National Defence Force Order
SANDFP	(South African) South African National Defence Force Publication
SANS	South African National Standard
Sec Def	Secretary for Defence
SECI	Socialisation, Externalisation, Combination and Internalisation [model]
SIGINT	Signal Intelligence
SITA	State Information Technology Agency
SMCS	Structure Management Control System
SMS	Senior Management System
SO1	Staff Officer First Class
SOC	State Owned Company
SPF	(South African) Strategic Planning Framework
SRQ	Secondary Research Question
SSO	Senior Staff Officer
UK	United Kingdom
USA	United States of America
USAF	United States Air Force

CHAPTER 1

INTRODUCTION, BACKGROUND AND OBJECTIVES OF THE RESEARCH

1.1 BACKGROUND

> *"Drowning in information* [and data]*, but starved for knowledge"* (Naisbitt, 1984: 17).

Society is currently in the knowledge age or –era or –economy, sometimes also referred to as the knowledge-based economy[1]. Knowledge is central to economies and to be able to survive and gain advantage with. The knowledge era recognises knowledge as the fourth economic pillar (capital, labour and land being the other three pillars[2]). Each of these pillars represents different sources of value or value creation capacity.

> "…, from an economic standpoint, traditional factors of production - land, labor, and capital - no longer occupy center stage as a means to leap forward. …, knowledge has become the key economic resource. …with everything else dropping out of the equation, knowledge has become the primary source of competitive advantage[3]. Competitive advantage depends on the smartness with which knowledge is used throughout the enterprise." (Neilson, 2001: 318).

A perspective on the importance of knowledge and the knowledge economy as an evolutionary state for society at large is as follows -

> "As we enter the 21st century we are moving into a new phase of economic and social development, which can usefully be referred to as a "knowledge economy" [phrase already coined in 1996], in which knowledge will be a key determining factor in organizational and economic success or failure. The most effective organizations in the knowledge economy will be those which recognize and best harness the crucial role that knowledge plays both inside and outside their organizations." (Servin, 2005: 10 from the Knowledge Enhanced Government: A strategy for the UK Office of the e-Envoy, 2002).

The peculiarity about this is that knowledge has always been an economic pillar. Knowledge has always been an intrinsic part of capital and labour or people – yet, it has never been separately acknowledged as such. Knowledge enjoys recognition for its centrality to economic development (OECD, 1996) and value creation capacity in the knowledge era.

Another dimension of the knowledge era is Schwab's (2016) suggestion that the world is in the Fourth Industrial Revolution, i.e. the Digital Revolution with accelerating the levels of complexity within business and militaries. This has vast implications for development – security nexus. This is supported by Procházka (2017) in an article about the institutionalising analytical

[1] OECD, 1996; Standfield, 2002; Pérez-Montor, 2004; Servin, 2005; Wang & Gu, 2005; Halawi, Aronson & McCarthy, 2005; La Grange, 2006; BenMoussa, 2009, Hassan & AL-Hakin, 2011; Tubigi, Alshawi & Alalwany, 2013; Zhang, 2013; KMI™, 2014; Zieba & Zieba, 2014.
[2] Pérez-Montor, 2004; La Grange, 2006; Zaim, Tatoglu & Zaim, 2007; Ďurišová, 2011; Rašula, Vukšić & Štemberger, 2012.
[3] This view is now supported by several academics, as discussed throughout the dissertation. Competitive advantage can be equated to military (strategic) advantage for militaries.

support functions to bolster defence management. Schwab (2016: online) states that the Digital Revolution - "… is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.". The resulting complexity is described by Schwab (2016: online) as the result of the - "… velocity, scope and systems impact" of the Digital Revolution in society. Schwab (2016) describes the current developments as without previous precedent, unfolding at an exponential pace and being ubiquitous. Access to knowledge is currently unlimited (Schwab, 2016), thus unlocking unlimited permutations thereof. In other words, access to unlimited new knowledge. Bontis (2001: 41) states that - "… codified knowledge will double every 11 hours" by 2010. This reality, according to Schwab (2016: online), will be driven by -

> "… emerging technology breakthroughs in fields such as artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3-D printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing. Already, artificial intelligence is all around us … driven by exponential increases in computing power and by the availability of vast amounts of data [and information]".

The growing awareness of the critical importance of knowledge as part of the sustained drive towards business and military superiority and dominance is thus clear. This results in an increasing requirement for knowledge to be managed (Halawi, Aronson & McCarthy, 2005; Manuri & Yaacob, 2011). Knowledge management and information management (IM) have been at the receiving end of much debate for literally decades by strategists, management- and knowledge practitioners and academics[4] alike. This debate is informed by the recognition of the perceived value of knowledge as a change agent, advantage multiplier and contribution to strategic and military capability. However, knowledge and the management thereof remain very nebulous constructs due to philosophical disagreements on the schools-of-thought battlegrounds as well as a practical disagreement in the boardrooms of business and military organisations -

> "The concept of- knowledge management (KM) has been around for decades, but most organizations accept it only as theory and have not put it into practice. It has been difficult for many firms to evolve their organizational thinking from an information focus to a knowledge focus.". (Cope, Cope & Hoatard, 2006: 41)

Knowledge management also receives much academic attention because of the continuous organisational drive to implement KM initiatives and the difficulties to do so successfully (Arthur, 2013; Črnjar & Dlačić, 2014). Debates are, however, gradually maturing. Debates are meandering away from arguments about what knowledge is, towards recognizing that knowledge exists as creations of individuals and organisations and thus requires management. Neilson (2001: 334) aptly states the following -

> "In 1787, James Madison writing in the Federal Papers said "To give information to people is the most certain and legitimate engine of government". Extending Madison's notion, the time may have arrived where providing access to information and knowledge may be the most certain and legitimate functions of government".

[4] Grant, 1996a & b; Uit Beijerse, 1999; Nonaka, Toyama, & Konno, 2000; Kakabadse, Kakabadse & Kouzmin, 2003; Cope, Cope & Hoatard, 2006; Hall, Dalmaris, Else, Martin, & Philp, 2007; Riempp & Smolnik, 2007; Guillou, Lazaric, Longhi & Rochhia, 2009; Ma & Yu, 2010; Xu, Housin, Caillaud & Gardoni, 2012, Črnjar & Dlačić, 2014 and many more.

In order to do this, knowledge needs to be managed. BenMoussa (2009: 1491) writes that - "[KM] is a discipline that needs to be considered in any modern business strategy and planning". Strategy and KM systems are typically employed to cope with future "… open-ended" challenges, increasing complexity and volatility currently experienced on an international scale (Shariq, 1997; Maule, Schacher, Gallup, Marashian & McClain, 2000; Lee & Hong, 2002; Zhang, 2013).

Knowledge management is a dynamic environment and will remain so indefinitely. From the vigorous debate on KM, much theory (what is KM) and models (how to manage it) have been constructed and proposed over the past 15 years, focussing on virtually all components of current business practices. Interestingly, based on research by Ma and Yu (2010)[5]. However, not much is published on the peculiarities of military KM. Onyancha and Ocholla (2006) and Ma and Yu (2010) contributed an analysis of the intellectual structure of KM as a subject field. Ma and Yu (2010) do not address any peculiarities of the public sector or military KM; but rather the business-related themes. Their research highlights the relatively low volume of published material addressing public- and military KM. Arthur (2013) did an extensive qualitative meta-analysis on the barriers to the success of KM initiatives of public and private organisations. Forty case studies where researched – the Departments of Defence (DOD) or militaries were not among them. This is probably not due to oversight or preference but probably purely based on the availability of published material on military KM initiatives.

Internationally, public sector (including the defence and security apparatus of governments) KM is gaining momentum due to a recognition of the vast benefits of having a coherent, integrated , enterprise-wide KM system that enables complexity management (McNabb, 2007; Rašula, Vukšić & Štemberger, 2012) and unlocking advantage. The complexity stems from - "… rapid, radical, discontinuous or nonlinear" change in the macro environment (BenMoussa, 2009: 1492) combined with issues such as managing knowledge as a strategic resource; effective acquisition, management and dissemination of knowledge; complex decision-making; organisational knowledge drain; creating learning organisations; opportunity exploitation; threat analysis and risk management; and requirements for good governance (McNabb, 2007; Degen 2008).

> *"Knowledge Management is one of the things that make warfare in the future different from warfare in the past."* (General Martin E. Dempsey, 2009 in Mortensen, 2014: 10).

Defence (as an organ of State and primary public sector organisation) is a complex, knowledge-dependent, high consequence of error, capital-intensive and national security instrument. Defence is confronted with ever-increasing complexity in every sphere of life and in a multitude of military environments in order to secure a perception of peace and security[6] -

> "The Fourth Industrial Revolution [digital revolution and the consequential complexity] will also profoundly impact the nature of national and international security, affecting both the probability and the nature of conflict. The history of warfare and international security is the history of technological innovation, and today is no exception. Modern conflicts involving states are increasingly "hybrid" in nature, combining traditional battlefield techniques with elements previously associated with nonstate [*sic*] actors. The distinction between war and peace,

[5] Ma & Yu (2010: 179) researched what they call "field-defining titles" and authoritative authors on KM for the period 1998-2007. Military KM does not feature at all.
[6] Bartczak, Boulton, Rainer, Oswald & O'Mally, 2010; Plant, 2000; Bower, 2001 and Cho, 2000.

> combatant and noncombatant [*sic*], and even violence and nonviolence (think cyberwarfare [*sic*]) is becoming uncomfortably blurry." (Schwab, 2016: online).

"Leadership, sense-making, problem-solving and decision-making are more complex and more demanding in military situations …", highlighting the growing requirement for knowledge superiority by militaries (Manuri & Yaacob, 2011: 73) to gain advantage and dominate. Although much has been said and penned about KM, very little has been published, comparatively, about military KM (Bartczak, Boulton, Rainer, Oswald & O'Mally, 2010).

Various authors propose that KM has become an absolute necessity for militaries, and consequentially important for defence and security[7]. When considering that the core activity of any DOD is the acquisition, integration, maintenance and use of military capabilities to secure national interest; it makes sense that there should be the critical focus by DODs on military and other relevant knowledge in order to mitigate complexity and organically grow comparative or absolute military advantage. Knowledge management is critical to such endeavours. The USA and a handful of other developed nations recognised this requirement already at the beginning of the millennium. The USA is a leader in publishing on military KM, followed by the UK and Canada. More than a decade ago already, Bartczak, *et al*. (2002) identified (from a USA perspective) the need for research on military KM –

> "KM activities in military organizations must be deployed and conducted within a complex military culture, bureaucracy, and policy environment that have been well documented (Lehman and Sicherman 1999; CSIS 2001). Because of its unique structural and cultural attributes, the managerial, resource, and environmental factors that influence the military's KM efforts need to be investigated" (Bartczak, *et al*., 2002: 2477).

Degen (2008: 102) writes several years later that - "… the accelerated operational tempo of the War on Terrorism has forced [the USA military] to take an honest, in-depth look at how [the USA military] collect, analyse, debate, codify, write, and disseminate doctrine. …The current wars exacerbate the challenges of knowledge management". Other than USA military doctrine and military institutional documents and limited academic material on military KM, very little has been written and published about military KM.

Military operations aimed at dealing with some or all of the negative products of the global future are posited to be increasingly hazardous, increasing in tempo and steeped in unpredictability (Degen, 2008; Martin, Philp & Hall, 2009). This environmental complexity provides focus for management and operational processes on the criticality of organisational knowledge as the central source for advantage. Rašula, *et al*. (2012: 147) states - "For many companies, the time of rapid technological change is also the time of incessant struggle for maintaining a competitive advantage.". Thus, knowledge is perceived today as the greatest source of strategic power – both by business and by militaries due to its impact on sustainable competitive and/or military advantage. Comparatively, and having to factor in the knowledge era and associated complexity, there is silence with regard to the management of knowledge within the SA DOD. The researcher found no published material on South African DOD (SA DOD) KM.

[7] Prahalad & Hamel, 1990; Shariq, 1997; Degen, 2008, Popa, 2010; Arora, 2011; Manuri & Yaacob, 2011 and Darby, 2013.

Large parts of the SA fiscus are dedicated to the generation of knowledge for the execution of the defence mandate. This raises questions as to a perceived disinterest in KM by the SA DOD, and why? Should the SA DOD be employing KM and why? This research explores this perceived SA DOD disinterest in KM, possible reasons for SA DOD KM and how this could be accomplished. In terms of the larger stock of knowledge about KM, the research informs the subject community about certain peculiarities relating to military KM that is possibly also relevant to the business environment.

1.2 CASE STUDY

The study area of this research is the SA DOD. The SA DOD is not monolithic, but functions within a social reality that is defined by the South African socio-economic context and legislated departmental mandates. The SA DOD also functions within an international social reality defined by foreign policy, military and peacekeeping complexities. National and international environments do not function in isolation but are informed and influenced by each other in a very complex manner defined by structured and unstructured processes and events. The study area and unit of analysis are a public service organisation and State-funded function with a large asset portfolio providing defence and security capabilities, services and products.

The Constitution of the Republic of South Africa, 1996 (hereafter the Constitution) provides for a single South African National Defence Force (SANDF), a single police service and intelligence services, collectively known as the security services. The security services of the Republic of South Africa (RSA) are mandated by its Constitution to guard the RSA's national security as a national interest. In order to secure RSA sovereignty, national security must reflect the resolve of its citizens, individually and collectively. The citizens must live as equals. Citizens must live in peace and harmony, and must be free from fear and have quality of life. The national security requisite defines the primary objective of the SANDF as defending and protecting the RSA, - "… its territorial integrity and its people in accordance with the Constitution and the principles of international law regulating the use of force" (Constitution of South Africa, Chapter 11). In addition to the employment of the SANDF by the RSA President as proposed in Section 201(2) of the Constitution, the President or the Minister of Defence (MOD) may authorise the employment of the SANDF for service within the RSA or in international waters, for the following purposes -

- To preserve life, health or property in an emergency or humanitarian relief operation.
- To ensure the provision of essential services.
- To support any department of state, including support for purposes of socio-economic development.
- To effect national border control. (South African Defence Act: Section 18).

The Defence Review (DR) (2015: v) states it as follows – "South Africa's national security is centered [*sic*] on the advancement of its sovereignty, democracy, national values and freedoms, and its political and economic independence". The SA DOD relies heavily on various forms of data, information, and knowledge to execute this mandate. To be successful in the execution of the said mandate in the knowledge era many resources are required of which knowledge is the primary resource. The SA DOD requires a Knowledge Management Capability (KMC) to ensure

coherence and integration of knowledge to mitigate inefficiency and risk which is unacceptable from a governance perspective, i.e. accountability to the South African citizen and taxpayer to provide the best possible defence and security in order to remain sovereign and free from fear and want, at the best possible price. The SA DOD, however, seems disinterested in KM and a KMC. This dissertation is positioned to address some of the fundamental knowledge gaps about KM within the SA DOD resource management approach.

1.3 THE RESEARCHER

The researcher is an appointed SA DOD Senior Staff Officer (SSO) working at the Defence Matériel Division within the Secretariat for Defence. The researcher is involved with the management of SA DOD Intangible Assets (IA), more specifically Intellectual Property (IP). It is within this context that the researcher discovered the resource management gap, i.e. coherent and integrated SA DOD KM. Although much knowledge is generated within various SA DOD components; knowledge is seemingly managed in silos hampering decisions, actions (including no action), effects and advantage and thus the execution of the SA DOD legislated mandate. There is thus an absence an integrated SA DOD KMC.

The researcher adds 29 years of experiences as a soldier; trained as a Marine and in naval surface and sub-surface operations, intelligence, defence matériel acquisition and technology development as well as SA DOD IP and IA management and SA DOD policy writing; to the construction of this dissertation. The researcher is motivated by the fact that this is seminal research about a possible future for coherent and integrated SA DOD KM and a KMC that would positively impact SA DOD resource management with concomitant impact on SA DOD decision-making, actions, effects and advantage.

1.4 PROBLEM STATEMENT

In recent years there have been volumes of studies on the theory and application of knowledge and KM. Both qualitative and quantitative or empirical research focussed on business-related issues of performance, competitive advantage, management models, strategy, critical success factors, best practice, etc. Research addressing SA DOD KM are limited, if any.

The absence of coherent and integrated KM in the SA DOD remains a challenge due to the impact of knowledge on decisions, actions, effects and advantage and the associated cost attached to these - stemming from the acquisition, technology development, intelligence products and operations. It is expected of the SA DOD to approach the future with specific integrated attributes and capabilities. The Defence Review 2015 summarises these requirements, complexity and challenges facing the SA DOD during the execution of its mandate in the following manner -

> "The [SA DOD] will be required to conduct a wide range of multi-dimensional military operations across a spectrum of complex, highly fluid and often lethal situations characterised by a wide variety of threats. Operations in the face of political, ethnic, cultural, tribal, linguistic and religious tensions will produce considerable human complexity. Future missions may range from non-combat operations (where the use of force will be absent or restricted to self-defence) to major combat operations with the application of potentially lethal force…The future force design

> will pursue a balance of capabilities that adhere to the strategic concepts of rapid reaction operations for interventions, expeditionary operations to project forces for protracted periods, complex war fighting [*sic*] within the human and physical dimensions of the battle space [*sic*], interoperability of command and control capabilities, concurrency of operations in multiple theatres and joint, inter-agency, interdepartmental and multinational operations (JI2M) … The defence capability must be robust and flexible and able to project and sustain joint landward, air, maritime, Special Force and military health operations over extended distances for protracted periods on the continent. The military operating attributes of: command and control; movement and manoeuvre; firepower; intelligence; protection and survivability; and sustainment must be embedded in all capabilities."(DR 2015, vii).

The projection above incorporates a significant requirement for data, information and knowledge to support the decision, actions, effects and advantage when applying these capabilities in complex environments with flexibility and agility in mind. In the quote above, the DR 2015 makes only mention of intelligence as a type of knowledge that is considered a critical operating attribute. The dissertation identifies several other types of knowledge that are considered critical for decisions, actions, effects and advantage.

Based on the DR 2015 and current SA DOD policies there are conscious SA DOD efforts to manage data and information on an enterprise-wide scale. The SA DOD utilises in parallel various platforms, systems, processes, strategies, leadership initiatives - all of which is calibrated and continuously augmented by organisational and individual cultures - to generate, create and manage data, information and knowledge. The SA DOD conducts annual strategic planning as required by the RSA regulatory framework. This strategic planning and hence the product thereof could be more effective and efficient if the sources of SA DOD data, information and knowledge were managed in a coherent and integrated manner. The knowledge hierarchy (i.e. data, information and knowledge) is managed throughout the SA DOD at various levels of sophistication. A key problem is still the incoherent and unintegrated (silo approach) manner in which the SA DOD conducts KM (if at all). Because knowledge accounts for the greater part of military advantage; barriers to create coherence and integration of available knowledge will lead to the erosion of military advantage and organisational efficiency and effectiveness (decisions, actions and effects). This poses a risk that is unacceptable from both a governance and defence perspective.

This predicament is evident from the noticeable void in SA DOD KM policy and doctrine. No mention and/or provision is made for KM in national legislation and the DR 2015, which is the capstone SA DOD Level 0 policy for the future. In fact, the DR 2015 recognises information as a strategic SA DOD resource, entrenching the SA DOD in the information era and associated thinking. The predicament is also prevalent in a vast number of SA DOD Level 1 policy and doctrine about information-, software-, financial-, information security-, personnel management and operational matters. It is accepted that KM is an absolute necessity for an organ of State such as the SA DOD[8]. Yet, there is very little published on the modalities of military KM. Nothing (or very little) is published on SA DOD KM that could stimulate debate about whether to manage and how to manage SA DOD knowledge coherently and in an integrated manner. These issues (amongst

[8] Hamel and Prahalad, 1990); Popa, 2010; Bartzak & England, 2005; Bartczak, *et al.*, 2010 and Arora, 2011).

others) will result in the deterioration of the national defence capability over time with commensurate wastage of funding and real or perceived national insecurity.

1.5 AIM OF THE RESEARCH

This research is a response to the limited stock of knowledge about military KM and specifically SA DOD KM. Based on the specific SA DOD contextual issues, the research aims at expnading the KM body of knowledge. The research thus purposefully drives towards the epistemological[9] and ontological[10] growth of KM theory. Rather than to test specific KM theory; this seminal research aims at understanding *to the extent of disinterest in, benefits and requirements for coherent and integrated KM in the SA DOD*.

The aim of the research has at least three levels. It is to provide clarity on the assumption that the SA DOD is not interested in KM. The second, providing motivation why KM is important for the SA DOD. Lastly, to envision definitions for SA DOD knowledge and KM, distil the types of knowledge to be managed by the SA DOD and describing the fundamentals for SA DOD KM. The third level conclude with a conceptual SA DOD KM model. Resolving these questions and knowledge gaps will provide the foundation for future SA DOD KM as a response to the challenges posed by the complex defence and security environment and mandate.

1.6 RESEARCH QUESTIONS AND CONCEPT

The primary research questions (PRQ) is - *What is the extent of disinterest in, benefits and requirements for coherent and integrated KM in the SA DOD?* Answers to these questions will achieve the research objective. Secondary Research Questions (SRQ) are as follows:

- *Question 1: Why is the SA DOD perceived not to be interested in KM?* This question is based on an assumption drawn from the lack of evidence of SA DOD KM.
- *Question 2: Should the SA DOD consider KM implementation and why?* Following from the first question the researcher elaborates on the importance of SA DOD KM and why.
- *Question 3: What categories and types of SA DOD knowledge should be managed?* It is important to discover what categories and types (subject fields) of knowledge exist in the SA DOD and which of these should form part of SA DOD KM in support of coherence and integration.
- *Question 4: What are the fundamentals that the SA DOD must understand about managing military and related knowledge?* Important factors discussed relate to processes, security, coherence and integration, leadership, enabling systems, etc. These fundamentals informed the construction of an SA DOD KM conceptual model. The research concept is based on the combination of the constructs depicted in Figure 1.1. -

[9] "The theory of knowledge, especially with regard to its methods, validity, and scope, and the distinction between justified belief and opinion." (Oxford Dictionaries. Online. http://oxforddictionaries.com/definition/english/epistemology)

[10] "The branch of metaphysics dealing with the nature of being" and/or "A set of concepts and categories in a subject area or domain that shows their properties and the relations between them". (Ibid., Online. http://oxforddictionaries.com/definition/english/ontology)

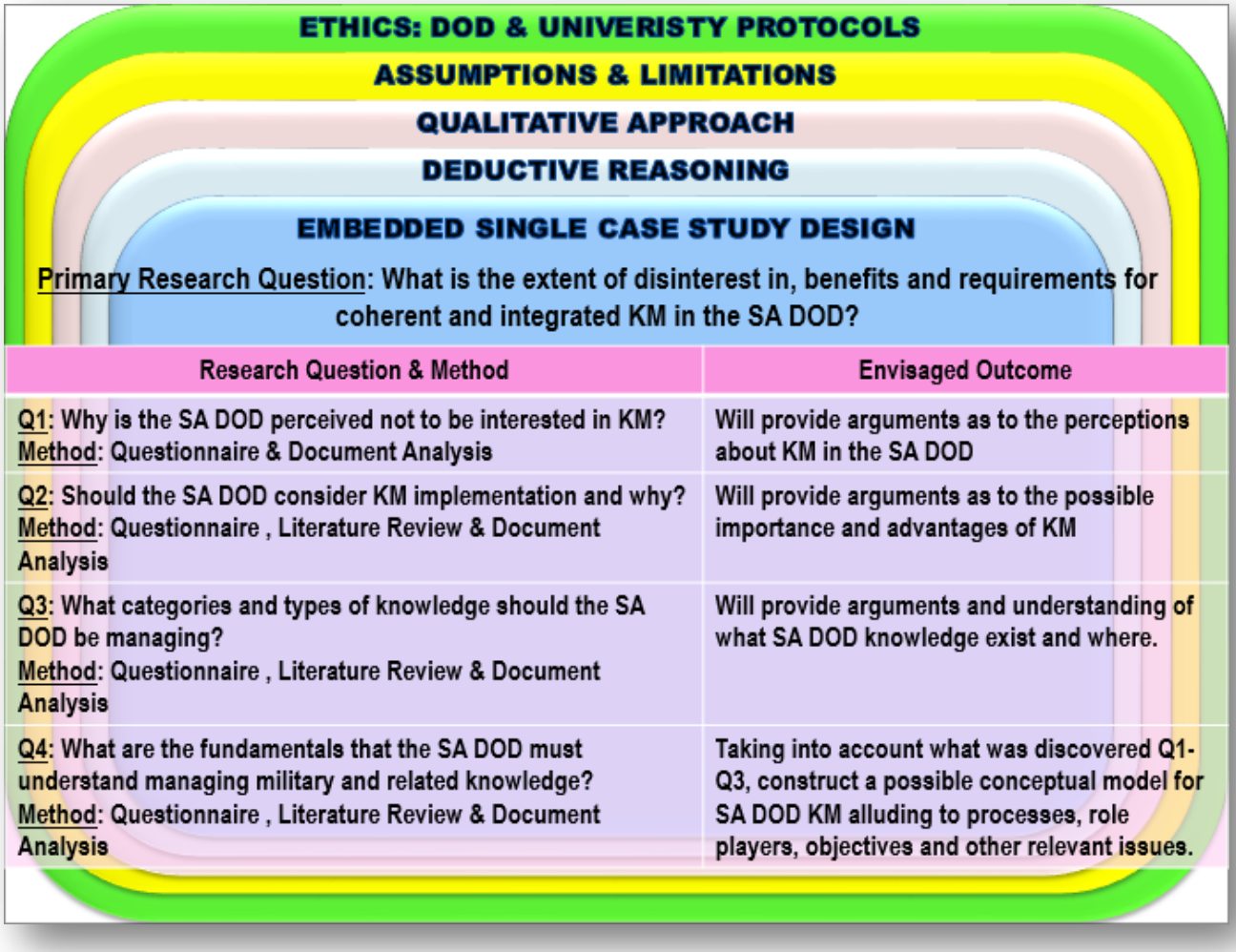


Figure 1.1: Outline of the Research Concept

Source: Author's compilation of information.

1.7 ASSUMPTIONS

The dissertation is informed by a number of assumptions. The researcher assumes that the SA DOD has no or limited interest in KM. Based on the literature, the researcher assumes that KM has a positive impact on organisational performance, and hence the apprehension about the SA DOD's perceived disinterest in KM.

It is assumed (based on experience) that decision, actions, effects and advantage are primary outputs and requirements for any organisation to be successful or dominate the competition. The SA DOD manages its knowledge incoherently and in an unintegrated manner which possibly negatively affects decisions, actions, effects and advantage. It is assumed that the SA DOD has inherent organisational peculiarities that will require a specific KM model to institutionalise a coherent and integrated KMC.

Based on findings discussed in the literature reviews of the dissertation, it is assumed that the SA DOD has policy and doctrine that spans decades; but policy and doctrine on SA DOD KM will in all possibility have been written and approved during and/or after 2005. It is assumed that if no

strategic level KM policy or doctrine exists within the SA DOD; that there would not be coherent and integrated SA DOD KM structures and activities. The researcher assumes that collectively the SA DOD members have knowledge on what knowledge, KM and related concepts are, especially at the executive (strategic leadership) level.

1.8 LIMITATIONS

The research will be limited to a singular area of study - the SA DOD. This is a limitation in terms of scope. By limiting the research to the SA DOD the rest of the SA Defence Sector is excluded, limiting possible insights that could be gained from knowledge managers in, for example, the defence industry and at the defence institutes. A possible limitation is the inability to receive salient information from the SA DOD due to security reasons or due to the availability and/or willingness of respondents to complete the questionnaire.

The dissertation will not attempt to develop taxonomies of SA DOD knowledge, but rather a definition for SA DOD knowledge within which each type of SA DOD knowledge is conceptually supported. The dissertation will not attempt identifying all the relevant software currently being used to manage information and knowledge with. These issues can be resolved during further research; possibly during a KM readiness assessment.

The dissertation will prescribe definitions for knowledge and KM, a KM conceptual model and other KM fundamentals. These will not be tested for effectiveness and efficiency (i.e. their impact on organisational performance and/or military advantage). This can be the bedrock for future studies.

1.9 ETHICAL CONSIDERATIONS

Schurink (2005: 43) writes -"Ethical issues are the concerns and dilemmas that arise over the proper way to execute research, more specifically not to create harmful conditions for the subjects of inquiry, humans, in the research process". Streubert-Speziale and Carpenter (2003) and McMillan and Shumacher (2001) are some of the authors that write about the rights of participants, subjectivity during qualitative research approaches and other ethical dilemmas. These issues calibrated the researcher's ethical behaviour during the research.

The research and dissertation comply with the University of Stellenbosch Ethical Code[11] and processes and the Code of Conduct of the SANDF. As a general principle, the researcher is respectful of the privacy and anonymity where required or insisted upon, confidentiality and related rights of all prospective research participants, in particular, their opinions and views. Participation is completely voluntary. All participants were required to provide written consent (University of Stellenbosch consent form) to use their responses for the research. All participants retained the right to withdraw from the research at any juncture. Ethical approval for this research was granted by the University of Stellenbosch Research Ethics Committee for the period 15 February 2017 - 14 February 2020.

[11] University of Stellenbosch comply with the Declaration of Helsinki and the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

The researcher also obtained consent to conduct research on the SA DOD from principle officials within the SA DOD, i.e. the Secretary for Defence (Sec Def), the Chief of the South African National Defence Force (C SANDF), the Chief Human Resources and the Chief Defence Intelligence (C DI). The documents are available on request. Once completed, the dissemination of the research report might be classified to protect the interest of the SA DOD in terms of SA DOD security policy.

1.10 DISSERTATION ROADMAP

Chapter 1 (Introduction, Background and Objectives) introduces the context for the report, describing the problem statement, purpose statement and objectives of the report and outline the research questions, limitations and ethical considerations. Chapter 2 (Literature Review: Knowledge Management Theory and Practice) provides a focussed literature review of the primary theory relevant to SRQs 2, 3 and 4, concluding with important factors for consideration in later chapters of the report. Chapter 3 (Literature Review: Military Knowledge Management in Practice) focuses on analysing the USA military KM experience – providing possible answers to SRQs 2, 3 and 4. Chapter 4 (Research Design and Methodology) describes the research methodology used to compile the dissertation. Chapter 5 (The Legislative Framework and Defence Review 2015: Impact on the SA DOD from the Perspective of Knowledge Management) and Chapter 6 (South African Department of Defence Knowledge Management Level 1 Policy and Doctrine) focus on the document analysis of relevant SA DOD policy and doctrine that would shed light on all the research questions, concluding with important factors for consideration in later chapters of the report. Chapter 7 (Attitudes and Views of Respondents about South African Department of Defence Knowledge Management) presents an analysis of the questionnaires and provides possible answers to all the questions. Chapter 8 (Conclusion, Contribution and Closure) crystallises the findings stemming from Chapters 2-3 and 5-7, concluding the research report with a statement on the contribution of the research and possible related questions for future research. The next chapter of the dissertation is a literature review and focuses on pertinent knowledge and KM related academic material to provide supporting arguments for the answers to SRQs 2-4.

CHAPTER 2

LITERATURE REVIEW: KNOWLEDGE MANAGEMENT THEORY AND PRACTICE

2.1 INTRODUCTION

Chapter 2 of the dissertation surveys the literature and assists the researcher and reader of the dissertation in understanding the asset to be managed as well as how the academic and business community has conceptualised KM since its inception. This is achieved with a documentary assessment of the general KM theory and practice. Importantly also, this chapter will identify potential gaps in the literature that might impact the future implementation of KM in the SA DOD.

The creation, sharing and use of knowledge have been and are central to private and the public sector (also, the military) and closely associated with the concept of advantage. However, not much tailored military KM theory has been developed and published since the advent of KM. The military, in general, subscribes to theory and practice developed by academics and practitioners for business. As such, over the past decade, some countries started to develop and implement KM in their militaries. However, it is the business community that remains at the forefront of KM theory and application.

The aim of the literature review is to provide a concrete base to support arguments why the SA DOD should be interested in KM, why and how SA DOD should manage knowledge. The literature review is exploratory in nature and endeavours to present the reader with theory, concepts, applied knowledge from the field, summaries and conclusions in an integrated narrative. Definition of terms and concepts are part of the developing narrative creating inclusive arguments without the requirement to refer back to a particular section dealing with definitions of terms.

Due to the cross-impact that both knowledge and management have on these various scientific research fields, the literature review will explore concepts and paradigms and their possible impact on KM with a wide angle lens (reasoning from a general perspective to a more specific perspective) to support deductive reasoning.

2.2 THE DEBATE

> *"[T]he only certainty is uncertainty, the only reliable source of lasting competitive advantage*[12] *is knowledge"* (Nonaka, 1995 in Ďurišová, 2011: 45).

To construct an understanding of the importance of KM for the SA DOD the researcher introduces a brief overview of the history of KM. Knowledge management, from a process perspective (create, capture, storage, retrieval, distribution, use, etc.) was possibly first practised by the Cuneiform language approximately 3000 BC. The debate about KM did not necessarily start in 3000 BC (Kakabadse, Kakabadse & Kouzmin, 2003); but KM was probably practised unknowingly

[12] "Competitive advantage is normally defined as the ability to earn returns on investment consistently above average for the industry (Porter, 1985)" (Halawi, Aronson & McCarthy, 2005: 77)

(Cong & Pandya, 2003: 26 in Arthur, 2013: 1). Definitions conceptualising both knowledge and KM as constructs are discussed later in this chapter and in chapter 3.

Since 1986, what everybody has been doing unknowingly was named, *Knowledge Management*, coined by Wiig in 1986 at the United Nations. Since then the debate went through various iterations of academic argument and critique to the point where, currently, KM has gained broad international acceptance. The majority of KM material published up to present addresses mostly business related KM theory and application (Carrillo, 2002 & Noeth, 2004 in La Grange, 2006). Although there are still considerable differences or disagreement on what knowledge and KM are; several decades of research and debate have contributed significant understanding of these highly contested and congested fields of study.

Although it is interesting to ponder the development of KM as a subject field as described by Zhang (2013) and other writers, it is more useful to consider the developed theory and how it can assist with creating and maintaining an advantage (competitive advantage and/or military advantage). There are always challenges from all corners to an emerging field of study, questioning its *raison d'être* and its possible long-term impact on organisations and business. One such question raised by academics and practitioners alike – is KM just a passing fad?

KM was labelled as just a - "… passing fad" (Servin, 2005: 9) or a -"… management fad" (La Grange, 2006: 39) probably due to KM failures in certain business areas and/or because the KM discourse is so attenuated by the noise resulting from the IM, computer technology and software management discourse.

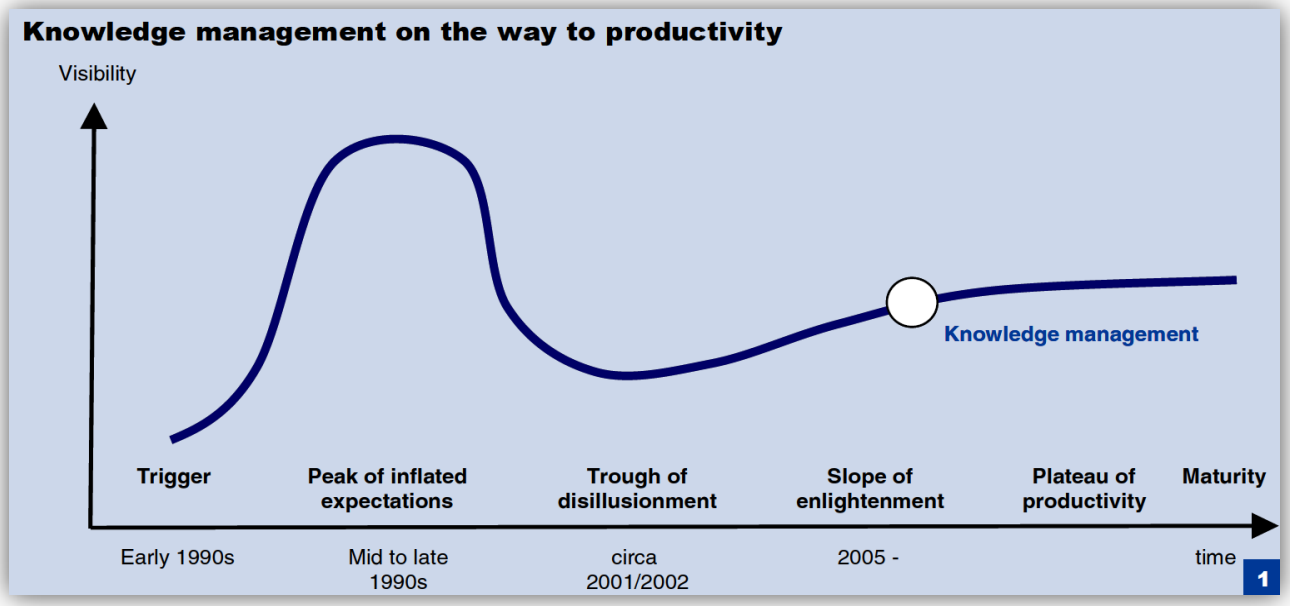


Figure 2.1: Knowledge Management Development

Source: Riempp and Smolnik (2007: 3).

Knowledge management as a field of study or management discipline has emerged and developed of the past ten to fifteen years (King, 2009: 3). Studies published by Onyancha and Ocholla (2006: 8) based on the density of KM publications (South African perspective) supports the research by Riempp and Smolnik (2007) displaying how KM rose, fell and stabilised. Riempp and

Smolnik (2007: 3) graphically summarise KM development into a recognised management science according to a six-phase or period - "… hype cycle" posited to enhance competitive advantage and increase productivity.

The notion of KM being a 'passing fad' is visible as the KM development path slumped down into a 'trough of disillusionment' during the late 1990s to early 2000s based on the hype cycle above. Several authors provide supporting arguments and labels for the various periods depicted in the hype cycle: Trigger period (Snowden, 2002, Tuomi 2002, Anand & Singh, 2011); increased expectations from KM (Jacobs, 2004; Onyancha and Ocholla, 2006; Riempp and Smolnik, 2007, Zhang, 2013) and thus also an increase in publications (Bouthillier and Shearer, 2002; Onyancha and Ocholla, 2006); disillusionment (Zhang, 2013); slope of enlightenment (Kakabadse, *et al*., 2003; Zhang, 2013); plateau of productivity and KM maturity (Bullinger, Spath, Warnecke and Westkämper, 2009 and Zhang, 2013). Anand and Singh (2011: 926) categorise the development of KM into three generations as follows –

> "…the period 1990-1995 can be called as the first generation of KM. The initial work started with defining KM, investigating the potential benefits of KM for businesses, and designing specific KM projects (Senge, 1990; Nonaka, 1994; Quinn, 1992; and Wiig, 1993). Advancement on artificial intelligence influenced research on KM, mainly in the direction of knowledge representation and storing can be seen (Mui & Carthy, 1987; Levine & Pomerol, 1989; and Ignizo, 1991). KM practical application to organizations started around 1996, which can be stated as the second generation of KM. Many organization have started implementing KM during this generation, KM research issues focus was business development (Grant, 1997; Thierauf, 1999; and McAdam & Reid, 2001), organizations (Alavi & Leidner,1999; Hasan, & Gould,2003;and LanSia, & Al-Hawamdeh, 2003), frameworks (Holsapple & Joshi, 2002a; Rubenstein-Montano, B., et.al, 2001; Chua, 2003; and Maier & Remus, 2003), operations and processes(Rajan, Lank & Chapple, 1999; Pervan, & Ellison, 2003), techonigical advancement (Carneiro, 2001; Nemati, *et.al*., 2002; Liao, 2003; and Metaxiotis, & Psarras, 2003). Third generation emerged around 2002 where focus seems to be on result part [*sic*] such as the link between knowing and action (Paraponaris, 2003).All knowledge is inherently social, cultural and organizational knowledge can only be realized through change in organizational activity and practice."

The period labelled 'peak of inflated expectations' possibly gave rise to an increase in KM research and publications to substantiate perceptions. Onyancha and Ocholla (2006: 8) published empirical research to illustrate such increase in publication activity during these cycles. It probably also coincide with expressions and papers published by major organisations such as the Organisation for Economic Co-operation and Development (OECD) based in Europe, stating - "The term '*knowledge-based economy'* stems from this fuller recognition of the place of knowledge and technology in modern OECD countries" (OECD, 1996: 3).

Knowledge management gained more understanding with an increase in research and publications during the late 1990s and early 2000s. This also probably contributed to the introduction and shift of modern society toward the knowledge era. The advent of the knowledge era contributed to the accelerated developed of KM as a management science.

The Riempp and Smolnik (2007) hype cycle (Figure 2.1) projected that KM should currently be in the maturity phase or Third Generation KM (Anand & Singh, 2011). Focus has since shifted to knowledge assets (or Intellectual Capital (IC) – La Grange, 2006) inherent in people, business process, organisational culture and human behaviour. Kucza (2001: 16) states frankly - "… knowledge is mainly about humans and therefore the role of technology can only be of assisting nature [Davenport and Prusak 1998, McDermott 1999]". Thus, technology is still recognised as part of KM but somewhat relegated to a KM enabler role.

Ramsay (1996) in McAdam and Reid (2000: 317) states that KM - "… has passed the fad level". Dayan (2006: 8-13) states that KM is "… now [2006] a recognized term; very much publicized, and increasingly accepted in the corporate community". The internationally recognised Knowledge Management Institute™ is of the same opinion. Thus, the sceptics have been relegated to the shadows for now (Servin, 2005: 9). KM is here to stay (Girard, 2004). This is probably based on the benefits derived from KM; discussed later in the dissertation. Mortensen (2014: 7) states it frankly – "Knowledge Management; It's [*sic*] Not Just a Good Idea Anymore". This is based on the adoption of KM by the USA military as a critical advantage multiplier and widely published as such.

KM has been investigated and/or implemented by South African public service organisations for a number of years. Onyancha and Ocholla (2006) write on trends of KM in the RSA using descriptive informetric analysis, combined with IM. Onyancha and Ocholla (2006) found evidence that KM research only commenced in earnest in the mid-1990s, peaked during the 2000-2005 period and then gradually decreased (see Figure 2.2). The following graphic depicts the most active SA Universities on KM research:

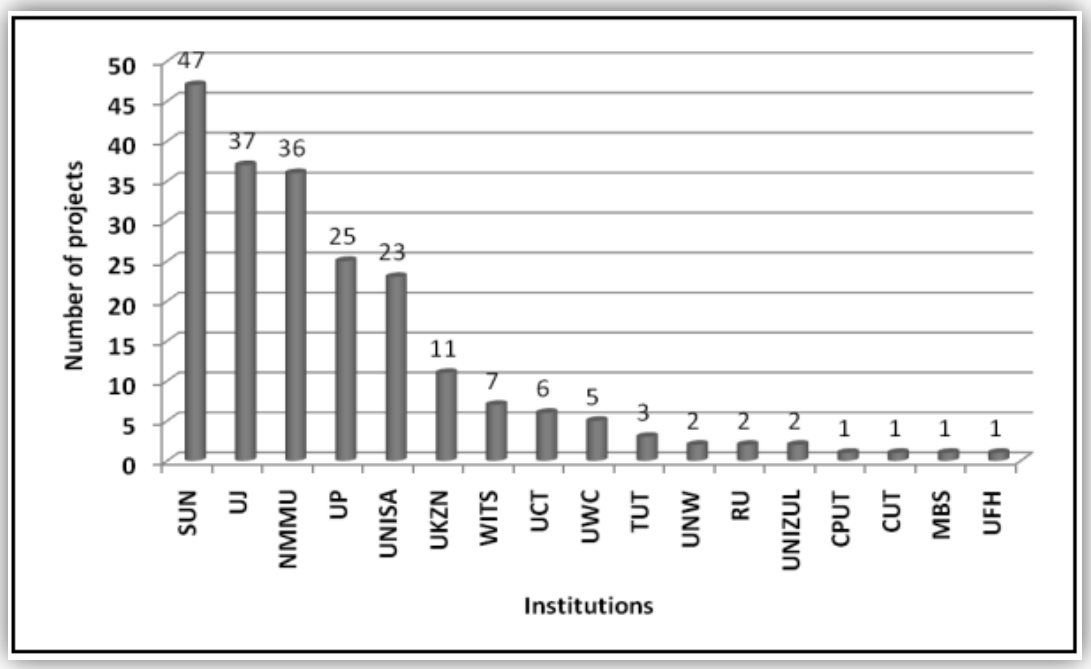


Figure 2.2: Institutions behind Information Management and Knowledge Management Post-graduate Research in South Africa [up to 2011]

Source: Onyancha (2011: 165).

The research by Onyancha and Ocholla (2006: 11) also summarises some of the key contributing fields of study by South African Universities on KM (IM was also considered), i.e. - "Information Studies …, Information Science … Business Administration, Economics, Information Technology and Communication Sciences, Business Management, Sociology, Computer science, Public administration/management, industrial and systems engineering, languages media and communication, nature conservation, Business information systems, Skills development and technology transfer, and business informatics". The most prominent of these were Management, Information Science, Computer Science and Business Administration. Over the period a total of 101 researchers from various research disciplines, backgrounds and interests published on IM and/or KM. This supports the view that KM is a multi-disciplinary field requiring an integrated approach.

Notably, the field of military science[13] did no studies on military KM during the period researched by Onyancha and Ocholla. Follow-up research done by Onyancha (2011), adopting the same approach, reflected similar trends. The researcher could also not find any research subsequent on KM for the SA DOD.

Concluding, *KM is here to stay*, not necessarily because of its perceived importance or dynamics of the process, but because of the importance of the asset which has a symbiotic relationship with survival and advantage. Organisations embracing KM due to the realisation that the world is no longer in the information era but the knowledge era; that knowledge is a strategic asset and not information; and that the management of the asset is directly correlated with survival and advantage.

Following from the above, the next section discusses the theory regarding knowledge in support of the crafting of SA DOD knowledge and KM definition proposals in later chapters. Definitions for these constructs are fundamental to the creation and establishment of a future SA DOD KMC. It is also part of the answer to SRQ 3 and 4. Theory will be followed by a practical discussion about KM in organisations.

2.3 KNOWLEDGE - THE ASSET TO BE MANAGED

> *"The study of human knowledge has been a central subject matter of philosophy and epistemology since the ancient Greeks."* (Kakabadse, *et al*., 2003: 75).

Knowledge shapes every conceivable facet of the world as currently known, through the decisions and actions taken by people, driven by human safety and insecurity perceptions, the constant quest to survive, perpetual reach for progress and the need for success and to dominate. Thus, if humanity needs knowledge; what does knowledge consists of that makes it so irreplaceable? This is an important question because it informs how knowledge should probably be managed. Thus, in order to understand why it is important to manage knowledge and what type of knowledge; the researcher delved into the abyss called *knowledge*.

[13] Managed by the Military Academy – a faculty of the University of Stellenbosch, as well as other contributors to tertiary programmes for the SA DOD - University of the Witwatersrand and Tshwane University of Technology.

The discussion about knowledge should logically start with the question - *why is there a need for knowledge*? Understanding the answer to this question should be the basis for each organisation to define knowledge purposefully for their business and service reality. Also, this could provide insight into the need for and modalities of KM. Uit Beijerse (1999) uses the opinion of Nietzsche (1882) positioning the need for knowledge firmly on the shoulders of the need to manage uncertainty and survival (supported by Probst, 1998 and Wiig, 1999b). This is closely linked to the first and second levels of human need, which is biological- and safety needs, according to the Maslow hierarchy of human needs (Maslow, 1943). Both these needs can be summarised as the need to survive. It could be argued that people need knowledge to survive the impact of the changing environment and/or to reduce the risk emanating from decisions required to take actions to survive. In fact, arguments can be tabled for the need of knowledge at every level of the Maslow hierarchy to progress to the next level of the hierarchy. This seems all very medieval; *or is it*?

In the contemporary and globalised world, the quest for survival is found at various levels in many social realities. Knowledge is needed for the physical day-to-day survival of people sustainability of the environment (knowledge related too relative security, defence, medicine, food production, water harvesting and purification and energy production); for the survival of economies, i.e. how to make the production factors produce effectively and efficiently in support of human life, security and sustainable growth; for the survival of commercial businesses at the micro level (market niches, comparative and competitive advantage, business intelligence); for the management of military advantage (policy and doctrine development, defence research and technology development, defence intelligence, capability and competence development) – to name but a few.

According to Bennet, Bennet and Lee (2010) knowledge generated by military organisations greatly benefit the wider society. This is based on the fact that knowledge co-evolve with its environment to such an extent that it benefits the economy and society at large. Military technology development is one such example. To name but one such instance, the internet; developed by the USA military and a key contributor to the phenomenon called globalisation and a key contributor to the current ability of populations to coordinate action and mass very quickly in protest or support.

Other writers skip the argument about survival and take the argument directly to the need for knowledge in decision-making and action (Emadzade, Mashayekhi, & Abdar, 2012 in Alrubaiee, Alzubi, Hanandeh, & Ali, 2015). These are obvious precursors for survival and success. These are very practical arguments and will be discussed and developed throughout the dissertation.

Therefore, without further pondering the notion of whether knowledge exists from an ontological perspective; *it does*, and whether there is a need for it; *there is, and it is considerable*. Thus, if humanity needs knowledge; what is packed into knowledge that makes it so irreplaceable? The existence of knowledge, the need for it and the fact that it is perceived to be irreplaceable have not brought professionals or academics any closer in defining the construct. This is probably because knowledge does not exist in a vacuum but is ubiquitous, context-bound and gets confused with other constructs such as information. The researcher compiled a list of descriptors on what knowledge is perceived as in order to provide an overview of the level of diversity in understanding of this important construct. The following represents an analysis of the considered knowledge definitions and descriptions published:

Table 2.1: Typologies of Knowledge – a Pluralist View

Knowledge Descriptors	Authors	Practical Value
"Justified true belief" "Justified personal belief"	Plato in Zhang (2013: 11), Anand & Singh, 2011, 927) and Kakabadse, *et al*. (2003: 86); Na, 2015: 12) King (2009: 3)	Very little practical value due to the contentious nature of the constructs because of the divergent opinions about what is justified, what is true and whose beliefs are authoritative.
Mythos "(in literature) a traditional or recurrent narrative theme or plot structure." Or "A set of beliefs or assumptions about something." Logos In "Theology [-] The Word of God, or principle of divine reason and creative order, identified in the Gospel of John with the second person of the Trinity incarnate in Jesus Christ." "(in Jungian psychology) the principle of reason and judgement, associated with the animus."	Socrates (Plato, 1953) in Kakabadse, *et al*. (2003: 80) Oxford Dictionary (Online)	Very little practical value due to the contentious nature of the constructs. Again the issue with the belief of who? An assumption is also not necessarily knowledge. In fact, it might be the opposite. With the current religious diversity in society, it will be very problematic to couple knowledge to a specific religion or any part thereof. From a practical organisational perspective, such as the SA DOD that gives recognition to religious freedom based on the Constitution, describing knowledge as such is not practical. The second version could have been useful if it only referred to 'reason and judgement'. However, these are contextualised with a psychological construct that is sexist ('animus[14]'). Again, the descriptor is not useful within the SA DOD organisational environment because the SA DOD subscribe to a non-sexist organisational environment.
Pure knowledge of nature and universality Proud knowledge of good and evil	Bacon (1605) in Kakabadse, *et al*. (2003: 80)	The identification of scientific knowledge is useful and can be practically identified and managed. This could be practically managed and can contribute to organisational survival and/or advantage. Knowledge of the perception of good and evil is contentious.
Tacit and Explicit Tacit, Implicit and Explicit	Polanyi (1966a) and Nonaka (1991) in (Uit Beijerse, 1999: 100) Polanyi (1958, 1996) in Kakabadse, *et al*. (2003: 80) Nonaka (1994) and Polanyi (1966) in Arthur (2013: 1) Anand & Singh (2011: 929-930.	These descriptors have traditionally added practicality to the description of knowledge as a phenomenon. These could be practically managed and contribute to organisational survival and/or advantage. A discussion of these descriptors follows in this chapter below.
Knowledge encoded structures in physical systems (e.g. genetic encoding in DNA) Subjective knowledge: beliefs which have survived our tests, evaluations and experiences Objective knowledge: knowledge claims that have survived testing and evaluation by agents	Popper (1972) in Zhang (2013: 14)	The identification of scientific knowledge is useful and can be practically identified and managed. The description of beliefs provided probably best describe conventional wisdom or good practice. Both of these could be practically managed and contribute to organisational survival and/or advantage.
General, Specific and Expert	Schank & Abelson (1977) in Kakabadse, *et al*. (2003:	These three descriptors do not describe what knowledge is but rather the level or domain of such

[14] P*sychoanalysis [-]* (in Jungian psychology) the masculine part of a woman's personality. (Oxford Dictionary, online)

Knowledge Descriptors	Authors	Practical Value
	80)	knowledge. They are practical because they can be calibrated and that calibration could be useful in organisations for decision-making and action. In fact, organisations will typically strive towards owning or controlling specific and/or expert knowledge that would facilitate first mover advantage. In other cases, such knowledge could just be applied to provide excellence in service or products. General knowledge from an organisational perspective might be associated with the day-to-day business. All three might be in tacit and/or explicit format. All three descriptors could be practically managed and contribute to organisational survival and/or advantage.
Resident and Access	Frantzich (1983) in Kakabadse, *et al*. (2003: 80)	These two descriptors do not describe knowledge but rather a location and a process associated with knowledge. Both have practical implications for the management of knowledge. Both impact the ability of organisations to achieve an advantage.
Declarative or descriptive, Procedural and Causal	Anderson (1985) in Kakabadse, *et al*. (2003: 80)	These describe some of the attributes of knowledge. Knowledge attributes are discussed later in this chapter. Procedural knowledge is a specific type of knowledge that has practical value within an organisation. This is discussed later in this chapter and in Chapter 3 of the dissertation.
General competence, Pragmatic, Reflective or evaluative meta-analytical skills and abilities	Holliday & Chandler (1986) in Kakabadse, *et al*. (2003: 80)	These descriptors fall within the domain of tacit knowledge, i.e. knowledge that is closely associated with human abilities developed over time. These are also recognised as being part of knowledge when considering the construct of IC as described later in this chapter and other chapters in the dissertation.
Embrained, Embodied, Encultured, Embedded, Encoded	Blacker *et al*. (1993) in Kakabadse, *et al*. (2003: 80) Wang (2008) in Zhang (2013: 15)	These describe knowledge the location of knowledge more than what knowledge is. Their practical value is in the recognition that they provide that people and culture are important in order to comprehend what knowledge is. They provide an indication that knowledge is a construct that is contained within an entity (whether that is a human or technology). These provide initial indications that knowledge might require a broader or different approach to management – other than a warehouse approach that is synonymous with data and information management. Wang (2008) also add that knowledge, by nature, is not static. This has a practical organisational value from a management perspective. Although it does not describe knowledge, it does identify the evolving nature of knowledge. These issues are discussed in this chapter below.
Embeddedness (individual or organizational), a combination of object and process, diversity, ambiguity, and a dynamic nature	Wang (2008) in Zhang (2013: 15)	
Technical, Cognitive, Sympathised, Conceptual, Operational system	Nonaka & Takeuchi (1995) in Uit Beijerse (1999) and in Kakabadse, *et al*. (2003: 80)	From these descriptors, only sympathises knowledge that presents little practical value. Cognitive and conceptual knowledge is closely associated with the human abilities, whereas technical knowledge and operational system knowledge can be found in most business and militaries.
Propositional, Practical, Experiential, Presentational	Heron (1996) in Kakabadse, *et al*. (2003: 80)	These descriptors of knowledge have practical value and found in most business and militaries. Together they form a loop stretching from ideas to

Knowledge Descriptors	Authors	Practical Value
		execution with feedback to create new ideas as a result of experience gained. These will impact the ability of organisations to achieve an advantage.
Taxonomic	Tsoukas (1996) in Kakabadse, *et al*. (2003: 80)	Knowledge is probably more than just a classification regime of some sort that differentiates between tacit and explicit knowledge.
Scientific, Social	Alvesson & Willmott (1996), Scarborough (1996), Burgoyne & Reynolds (1997) in McAdam & Reid (2000)	The identification of scientific knowledge is useful and can be practically identified and managed. Social knowledge might refer to social skills that are more tacit in nature, but knowledge nonetheless. Social knowledge could also refer to Relational Capital as contained in IC. Both have practical implications for the management of knowledge. Both impact the ability of organisations to achieve an advantage.
Personal, Proprietary, Public, Common sense	Boiset (1998) in Bouthillier & Shearer (2002)	These descriptors identify knowledge locations more than anything else, each of which might attract a different type of management style and processes. It is thus important to note that knowledge is not just present in people but also in other forms with different levels of accessibility.
Explicit, Tacit, Cultural	Choo (1998) in Bouthillier & Shearer (2002)	These descriptors have been discussed above already and will attract further discussion throughout this and chapters of the dissertation.
Intellectual Capital (IC)	Seemann, *et al*. (2000: 2 and 3), La Grange (2006: 6); OECD, 1996; Petrash, 1996; Heron, 1996; Steward, 1997; Edvinsson & Malone, 1997 in Kakabadse, *et al*., 2003; Probst, 1998; Uit Beijerse, 1999; Spender & Marr (2005); Riempp & Smolnik, 2007; Shariq, 2007; Zhang, 2013 and others	This descriptor is an inclusive categorisation of at least three categories assumed to be knowledge: Human Capital, Organisational Capital, and Relational Captial. Intellectual capital is discussed in more detail below in this chapter and referred to in discussions throughout the dissertation. It is a very practical method of identifying organisational knowledge to be managed.
Information in action	Kucza (2001: 15)	This is not a plausible description. There is a difference been information and knowledge. These differences are discussed below in this chapter. Also, by acting on information doe not convert that information into knowledge. There are several and varied processes to convert information into knowledge (also discussed below).
Product, Routine, Process	Edvinsson & Malone (1997) in Kakabadse, *et al*. (2003: 80)	These descriptors are included in the construct of IC as part of Organisational Captial. From a practical perspective, they are important for organisations to function and as differentiators, also to gain an advantage.
Theoretical know-how, Skills, T-shaped skills, Rules, Procedures	Riempp & Smolnik (2007: 4); Leonard-Barton 1995 in Yadav & Singh, 2013: 196)	These descriptors fall within at least two groups described in the IC construct; Human Capital (know-how and skills) and Organisational Capital (rules and procedures). IC as a construct is discussed further below in this chapter as well as some of the other chapters.
Human capital, Technology	Shariq (2007: 75) Uit Beijerse (1999: 95)	Human Capital has already been identified as a type of knowledge contained in the IC construct. Technology as a form of knowledge is probably closely related to explicit knowledge or the product of explicit knowledge.
Process template knowledge,	Jung, Choi & Song (2007:	These descriptors are practical organisational type

Knowledge Descriptors	Authors	Practical Value
process instance knowledge, and process-related knowledge.	22)	knowledge which could typically be included (if not already) in the IC construct. Excellence in these could possibly result in a position of advantage for the organisation. Process instance knowledge could also be associated with learning and a learning organisation.
Factual (data and scientific literature) Conceptual (perspectives and concepts) Expectational (judgements and hypothesis) Methodological (knowledge from reasoning and strategies)	Wiig (1993: 153) in Lungu (2011: 17)	Factual, conceptual and methodical are useful knowledge constructs from an organisational perspective. Expectational are less useful because of the inherent uncertainty it produces when having to engage in decision-making and action.
"Knowledge is experience"	McDermott (1999) in Kucza (2001: 16)	Knowledge cannot possibly be just 'experience'. This would exclude scientific and other codified knowledge and other constructs contained in IC. Knowledge is probably gained from experience. Experience could thus be construed as an important activity to gain knowledge.
Understanding "…gained from experience, analysis and sharing"	Knowledge Management Institute	This definition describes knowledge as understanding. However, understanding is probably a state of mind that is reached once knowledge was gained processed with various processes. The definition has practical value for organisations because it names various processes deemed important to be able to gain understanding.

Adapted from Kakabadse, *et al*. (2003: 80) and expanded.

The divergent views on what knowledge is, is very evident and would be a significant hurdle in the achievement of coherence with regards to KM in any organisation. However, without agreeing with any of the abovementioned descriptions of knowledge at this point, let us continue the discussion about what constitute knowledge as a construct.

There seems to be broad consensus on the knowledge hierarchy's distinction between the three related, but discrete constructs, i.e. data, information, and knowledge[15]. Another version of the hierarchy replaces 'knowledge' with "realization" (Kakabadse, *et al*., 2003: 77 and 78). Some authors (Kakabadse, *et al*., 2003, Anand & Singh, 2011 and Ďurišová, 2011) include wisdom at the top of the knowledge hierarchy. Lastly, Anand & Singh (2011: 932) include "Enlightenment" at the top of the conceptual pyramid. Bouthillier and Shearer (2002: online) write the following about these constructs -

> "Dictionaries define data as factual information (measurements or statistics) used as a basis for reasoning, discussion, or calculation; information as the communication or reception of knowledge or intelligence; knowledge as the condition of knowing something gained through experience or the condition of apprehending truth or fact through reasoning, and intelligence as the ability to understand and to apply knowledge. For Meadow, *et al*. (2000), data refer to a "string of elementary symbols, such as digits or letters" (p.35). As they point out, information "has no universally accepted meaning, but generally it carries the connotation of evaluated, validated or useful data" (p.35). Knowledge, on the other hand, involves "a higher degree of certainty or validity than information" and "has the characteristic of information shared and

[15] Wiig, 1993; Boisot, 1998; Uit Beijerse, 1999; Nissen, Kamel, Sengupta, 2000; Alavi & Leidner, 2001; Bouthillier & Shearer, 2002; Kakabadse, *et al*., 2003; Malhotra, 2003; Girard, 2004; Pérez-Montor, 2004; Spender & Marr, 2005; Jung, Choi & Song, 2006; Riempp & Smolnik, 2007, McNabb, 2007; Anand & Singh, 2011, Ďurišová, 2011; Zhang, 2013 (not an exhaustive list).

agreed upon within a community" (Meadow, *et al*. 2000, p.38). Intelligence, for the previous authors, is a form of information but it is also "a measure of reasoning capacity" (p. 39). As we can see, many conceptual overlaps exist between all these terms.".

Let us have a closer look at the proposed components of the hierarchy. Zack (1999) in Kakabadse, *et al*. (2003: 76) defines data as being a representation of observations and/or facts without context and not meaningful by itself. Kakabadse, *et al*. (2003: 77) also add that data appears to be "context-free" and a "building block" of information and consequently knowledge. Davenport and Prusak (2000: 3) contrasts data and information to highlight the differences – "Unlike data, information has meaning … "relevance and purpose" ... Not only does it potentially shape the receiver, it has a shape: it is organized to some purpose. Data becomes information when its creator adds meaning. We transform data into information by adding value in various ways.". Spender and Marr (2005) simply state that "… information is more than data". Bouthillier and Shearer (2002: online) state about information that - "… information merely is data in context". Kakabadse, *et al*. (2003: 77) also add that information appears to be "context insensitive" and have utility in reducing uncertainty. The writer agrees with this description and adopts this view for the purpose of this paper.

Limited meaning can be created by adding various combinations of context ('who, what, where, when, why, how, etc, etc) to data. The limitation of information is that it does not have the same depth or density of context as that provided by knowledge. Information is thus less complex and probably easier to communicate and thus used more widely and freely in organisations and possibly perceived as knowledge.

Davenport and Prusak (1998) in Spender and Marr (2005: 7) and Na (2015: 16) separates knowledge from data and information by stating that - "… knowledge is neither data nor information". Uit Beijerse (1999) explaining that - "… knowledge is something more than information". Boisot (1998: 12) in Malhotra (2003: 2) states simply – "Knowledge builds upon information that is extracted from data" – i.e. the 'building block approach' mentioned by Kakabadse, *et al*. (2003: 77). Later Davenport and Prusak (2000: 5) in Marshal (2007: 5) state – "… most people have an intuitive sense that knowledge is broader, deeper, and richer than data or information". Kakabadse, *et al*. (2003: 77) states that knowledge is "context sensitive" and have utility in creating "new understanding". Thus, the difference between data, information and knowledge is the level of understanding, risk reduction and uncertainty alleviation that can be achieved.

It is worth noting that none of these expressions provide insight into where exactly the cross-over points are for or limit is data into information into knowledge. This is possibly the cause of dissonance when it comes to the correct use of the constructs, both contextually and practically. This possibly also raises the question as to the hierarchical nature of knowledge vs. a knowledge continuum. Wiig (1997) in Na (2015: 14) propose in this regard – "…whereas information consists of facts and data organised to describe a particular situation or condition …, the progression from signal, data, information, knowledge and wisdom may be a continuum with many grey area [*sic*] but these grey cases typically become clearer when considering how the "information/knowledge" will be used." Riempp and Smolnik (2007: 4) describe the knowledge construction process (knowledge hierarchy) as the contextualisation of data that gives rise to information, which when contextualised

and personalised to the point of action, gives rise to knowledge. These ideas highlight the role of context as a discriminator between the various constructs. The question remains, how much context is required to transit the divide? A knowledge continuum provide more flexibility for organisations to manage these cross-over lines.

Nonaka and Takeuchi (1995: 58) conceptualise information as a "…flow of messages, while knowledge is created by that very flow of information anchored in the beliefs and commitments of its holder.". Kakabadse, *et al*. (2003) describe the knowledge hierarchy as knowledge flow, which points to a dynamic process of sharing and conversion. This dynamic process is also referred to by Assudani, (2005: 34) in Dayan (2006: 3-3) as the "epistemology of action/process" of knowledge. These authors also refer to the "epistemology of possession", i.e. that knowledge can be possessed/owned by an individual or organisation. This epistemological description is clearly visible in conceptualising knowledge as IC. Another epistemological description not stated by these authors is that of knowledge control. Possession and control are not mutually exclusive concepts. Organisational IC could be owned (possessed) and controlled or just controlled but not owned (i.e. tacit knowledge) or owned but not controlled (e.g. IP).

McCann and Syke (2004) in BenMoussa (2009) state that this disagreement about what knowledge consists of creates barriers to the implementation of KM initiatives downstream when 'information' is regarded as 'knowledge'. If knowledge is perceived as objects or just information, organisations typically resort to implementing IM rather than KM. Construct dissonance can be construed as a primary culprit in the mismanagement of the knowledge hierarchy.

The perception that knowledge is 'more' than the other parts of the hierarchy – broadly supported by academics (Boisot, 1998; Malhotra, 2003; BenMoussa, 2009) might lead to attempts to quantification. Bouthillier and Shearer (2002: online) state that - "Knowledge differs [as opposed to being more] from information in that it is predictive and can be used to guide action while information merely is data in context". This view is supported by the researcher; knowledge should thus be described as something other than information or data to eliminate the constant drive towards quantification (positivism and objectivist approach), placing more emphasis on understanding and meaning (interpretivist approach).

A knowledge continuum, where data and information share cross-over space and information and knowledge share cross-over space, provides more space for the dynamic and evolving nature of knowledge. This concept can be related to the opinions of Kucza (2001: 17) on the constructs of knowledge scope[16] and knowledge depth[17]. The dissonance and grey areas are clearly visible in the various opinions above. It is for this reason that the notion of a knowledge continuum is preferable than that of a knowledge hierarchy.

[16] "…has vertical and horizontal differences. The vertical differences vary from less abstract to more abstract..." (Kucza 2001: 17) The horizontal differences in scope relate to the contextual knowledge differences between organisational functions and applications.

[17] "…initial awareness of facts and the ability to apply data to certain situations and act appropriately is the basic level of knowledge, which equals an understanding of one's own role in an organisation. Knowledge then tends to specialise. This signifies a higher level of knowledge … The requirements on the knowledge depth depend on the knowledge scope…" (Ibid., 17)

Military doctrine of developed nations recognises four elements in military knowledge: data, information, knowledge, and wisdom. (Kendall and McHale, 2003) Defence departments also typically have organisational components that manage intelligence (business organisations in some cases have the same). Chuter (2007: 14) is of the opinion that "…intelligence is a subset of information". Chuter (2007: 14-16) express a further opinion on what intelligence is and basically reduce intelligence to the information that is collected covertly. In the researcher's view, this is a very simplistic view of intelligence as a construct and product of the intelligence process. It begs the question – where does military intelligence fit in the knowledge hierarchy? Is military intelligence a form of data, information, knowledge (tacit or explicit) or is it wisdom based? While business intelligence is more than often reduced to market statistics; there are very few authors expressing views on the location of military intelligence in the knowledge hierarchy. This is problematic for military KM due to the fact that military decision-makers base decisions, actions and desired effects on military policy, doctrine, intelligence and strategy. Thus, a poor understanding of what intelligence is might lead to it being confused with data and information.

Military intelligence is, in essence, knowledge about own and opposing forces as well as geographic, socio-economic, cyber and other factors. Intelligence is also very contextual and time-dependent. The researcher is of the opinion that intelligence is just a specific type of knowledge and can contribute to wisdom. Kakabadse, *et al*. (2003) states that action and reflection may lead to wisdom, but also new knowledge. Na (2015: 15-16) describe wisdom as – "…the addition of experience. Experience is a cumulative matter; it may refer to an individual's own experience or to the collective experience of more than one individual information-processing perspective".

Wisdom is an integral part of being human. People are considered to be wise when reaching certain age categories, hence the saying 'the wise old man or woman'. However, the construct of wisdom is nothing else than the product of years of accumulated data, information, intelligence, knowledge, experience, skills and intuitive abilities. When articulated or manifesting in certain actions it becomes explicit and might be labelled as 'wise'. Agger (1991: 117) states that -"… every knowledge is contextualized by its historical and cultural nature", which might give rise to new knowledge and/or wisdom. So wisdom, following the reasoning above, is just a particular quality of knowledge and in the researcher's opinion, an above average quality level of tacit knowledge. Therefore, the quality of data, information and knowledge is critical if wisdom is claimed to be the product.

This said; wisdom in one social reality might be data, information or knowledge to another based on the knowledge continuum concept. Hence, wisdom is nothing other than a particular form of knowledge. The researcher's view corresponds with the post-modernist school to a large extent, supporting the notion that context remains the key with which any data, information, knowledge and so-called wisdom must be calibrated. History, as a calibration factor, also alludes to the time value of these constructs. In the contemporary globalised rush to get things done and to gain and maintain the advantage, near-real-time and real-time knowledge are critical for survival and/or advantage. The time value of knowledge will be discussed later.

In all probability, wisdom is the actual source of meaning, very difficult to separate from the knower (approaching knowledge as meaning – interpretivism) and thus difficult to codify explicitly (make an object or fact – objectivism). Military intelligence is usually the product of much

research, evidence gathering by humans and sensors, interpretation and report writing, etc. From this objectivist perspective, military intelligence is just explicit knowledge artefacts produced by general or tailored KM processes – mostly referred to as the intelligence cycle.

In order to take the discussion full circle, let's consider the 'chicken-and-egg predicament'. Alavi and Leider (2001) and Anand and Singh (2011) discuss the conception articulated by Tuomi (1999) that knowledge commonly constructed from data as the entry point (data › information › knowledge) should actually be constructed with knowledge as the entry point (knowledge › information › data). Tuomi (1999) argues that no data and/or information are created before some form of tacit human knowledge was subjected to a 'dynamic human process' [interpretivism], generating explicit knowledge, information and/or data [objectivism]. What Tuomi (1999) is possibly missing is that all the data and/or information inherent in nature are generated by technology (information technology (IT), software and sensors such as video links, radar, sonar, cameras and other technology-based sensors). Human ingenuity creates technological enablers, but once created, they generate volumes of data and information based on their use and settings (frequency, resolution, bandwidth, etc.). Thus, Tuomi's argument might have had relevance in prehistoric times, but today, the cycle of knowledge generation has a multiplicity of configurations and is not just a simple linear or binary configuration. Anand and Singh (2011) briefly state a theory of Nissen (2002) that a dual approach might be considered -

> "… making a distinction between knowledge seekers and knowledge creators. From the seeker point of view, data is put into context to create information, and information that is actionable becomes knowledge. From the creator perspective, knowledge is needed to create information, which is in turn needed to create data. Therefore, it seems sensible that a general hierarchy of data, information, knowledge, and wisdom should permit transition in both directions – a notion supported by Williams (2006).".

This is probably another reason why a knowledge continuum is possibly more preferable to a knowledge hierarchy. No matter from which end you construct the knowledge hierarchy or continuum, the fact of the matter is that today there is an unquantifiable amount of data, information and knowledge (*and some wisdom*) in circulation. This needs to be managed in the best possible way to get to the best possible solution to ensure survival or advantage and everything in between.

There are, however, no empirical guidelines on the exact configuration and character differences between data, information and knowledge, stemming from the philosophical disagreement. One can, however, safely say that knowledge contains information and data and will lead to different decisions and actions when context change. For that, KM is needed to optimise the desired effects and to obtain and maintain an advantage in the interest of survival and/or domination stemming from advantage.

Thus, if knowledge is more than its cumulative components - *what is it then*? Kakabadse, *et al*. (2003: 80) and several other authors have tackled this question. Divergent perspectives about the typology of knowledge often arise from philosophical and/or organisational views. Organisational views are often more practical and understandable and more directed towards business objectives, results and advantage. One very useful typology of knowledge assisting with the distinction of types of knowledge to be managed is the explicitness or tacitness of knowledge, a notion introduced by Polanyi (1966a and b) and supported by Anand and Singh (2011: 929-30) and

several other academics[18]. Anand and Singh (2011: 930) add implicit knowledge to the already well known tacit-explicit categorisation – "This is the kind of knowledge that can often be teased out of a competent performer by a task analyst, knowledge engineer or other person skilled in identifying the kind of knowledge that can be articulated but hasn't." This is, in essence, tacit knowledge that could be converted into explicit knowledge if required.

Zhang (2013: 15) states - "Knowledge is not merely an object [explicit knowledge] that can be "placed," nor should it be confused with representations of knowledge in documents, databases, etc. [explicit knowledge], but it can be seen as a collection of processes that allow learning [tacit knowledge] to occur and knowing [tacit knowledge] to be internalized.".

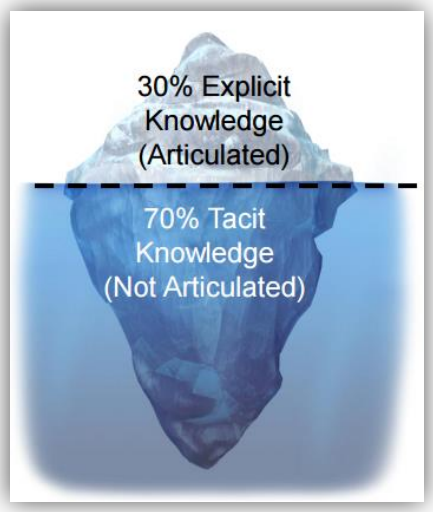


Figure 2.3: Tacit/Explicit Knowledge Dimensions

Adapted from Weeks (2016: slide 7). A similar depiction is found in Uit Beijerse (1999: 100) and Na (2015: 18).

Yadav and Singh (2013: 196) state very frankly that knowledge is in people. Tacit knowledge is considered to be personal in nature, based on individual experience, beliefs, perspectives and values (Nonaka, 1994; Polanyi & Rotstein, 1991; Tiwana, 2000; BenMoussa, 2009; Polanyi, 2009; Ďurišová, 2011; Zhang, 2013). Tacit knowledge is likely to be context-specific (BenMoussa, 2009). Tacit knowledge is also considered inseparable from people. Explicit knowledge can be articulated in language, transmitted among individuals by sound and can be documented. (Ďurišová, 2011; Bouthillier & Shearer, 2002). Weeks (2016: slide 7) graphically illustrate this separation in Figure 2.3. Several other writers[19] are of the opinion that tacit and explicit knowledge are complementary, which if true, points to the requirement for integrated when organisations attempt to manage knowledge. Bouthillier & Shearer (2002) contend that explicit knowledge is often equated to information, resulting in dissonance and management tension between KM and IM schools of thought and methods.

Tacit knowledge is also being considered inseparable from people, which makes tacit knowledge more suitable to be managed with KM methods than IM methods. Spender and Marr (2005: 7) and Zhang (2013: 11) write – based on the work of Davenport and Prusak (1998), that - "… In organizations, [knowledge] often becomes embedded not only in documents or similar inorganic forms and repositories but also in human forms such as organizational routines, processes, practices, and norms" – all forms of explicit knowledge and part of what is considered IC.

The symbiotic nature of explicit and tacit knowledge is probably a derivative of the SECI model approach, where it is posited that tacit and explicit knowledge can be transformed through a cyclical process (the SECI model is discussed later in the dissertation). The researcher supports these views.

[18] Nonaka, 1991; Uit Beijerse, 1999; BenMoussa, 2009; Ďurišová, 2011; Arthur, 2013; Zhang, 2013; and many more.
[19] Polanyi, 2009 and Nonaka, 1994 in Zhang, 2013 and Hlupic, Pouloudi & Rzevski, 2002 in Bouthillier & Shearer, 2002.

Spender and Marr (2005) articulate a possible distinct link between tacit knowledge and action - based on the fact that knowledge is associated with among other things; skills, competence and know-how. Polanyi (1966 and 2009) in Zhang (2013: 12) states that knowledge can be perceived as action based on the processes associated with knowing. Thus, for specific action to take place specific tacit knowledge (or know-how) must be present without which the action might not produce the required or predicted results. This is also true for explicit knowledge. This categorisation is important due to the difference in processes and enablers to manage these and the challenges to integrate the sources and processes.

BenMoussa (2009) highlights the problem of the commoditisation of knowledge as distinctly linked to the misperceptions about managing tacit and/or explicit knowledge with IT solutions. These issues are closely related to the discussion above about knowledge as an object (objectivism) or as meaning (interpretivism). Polanyi's (1966a) categorisation (i.e. explicit/tacit) highlights the importance of people (tacit knowledge – interpretivist and organic approach to knowledge) and science, technology and organisations (explicit knowledge – positivist and objectivist approach to knowledge) in any attempts to understand and manage knowledge. Darby (2013: 527) writes that -

> "Harnessing both explicit and tacit knowledge is an increasing and necessary challenge to support organisational knowledge creation for it is suggested that when explicit and tacit knowledge interact innovation occurs. This in turn prompts the view that organisational knowledge creation requires first, an acknowledgement of the importance and necessity for KM and second, understanding and managing the cyclical process…".

The distinction between tacit and explicit knowledge is thus important to understand what type of knowledge should be managed in the SA DOD. Another particular useful typology of knowledge, from an organisational perspective, is the construct of IC. Categorising knowledge as IC is supported by several writers[20]. Intellectual capital is the "… sum of a firm's skills, knowledge and experience are critical to sustaining competitiveness, performance, and shareholder value" (Seemann, De Long, Stucky, & Guthrie, 2000: 2)[21]. The longevity of this is stated by Litvaj and Stancekova (2015: 834) that the effective use of IC is crucial for competitive advantage in the 21st century.

"[IC] includes the intangibles such as information, knowledge, and skills that can be leveraged by an organization to produce an asset of equal or greater importance than land, labor and capital." (Neilson, 2001: 334). He states further that -

> "Human capital is all individual capabilities, the knowledge, skill, and experience of the organization's employees and managers. … Structural capital is the processes, structures, and systems that a firm owns less its people. Social capital is the goodwill resulting from physical and virtual interchanges between people with like interests and who are willing to share ideas within groups who share their interests.".

Shariq (1997: 75) writes that knowledge is - "… the embodiment of human [IC] and technology". Some academics consider IC to be assets that organisations own and control from a knowledge economy perspective (Seemann, *et al*., 2000 and La Grange, 2006). It also objectifies

[20] Probst, 1998; Wiig, 1999b; Seemann, *et al*., 2000; Malhotra, 2003; Spender & Marr, 2005; La Grange, 2006.
[21] Recognised by Probst, 1998; Bontis, 2001, Spender & Marr, 2005; Halawi, Aronson & McCarthy, 2005.

knowledge. Accordingly, IC can be subdivided into human-, relational- and structural capital[22] - pointing to where one would find knowledge or 'ba[23]' as well as the explicitness or tacitness of the knowledge. These are as follows in Table 2.1:

Table 2.2: Intellectual Capital

IC Component	Description	Academic Support
Human Capital The correct talent at the right time.	Individual capabilities, -knowledge, -skills and - the experience of employees. This is mostly tacit knowledge.	OECD, 1996; Petrash, 1996; Steward, 1997; Heron, 1996; Uit Beijerse, 1999; Seemann, *et al*., 2000; Neilson, 2001; Riempp and Smolnik, 2007; Shariq, 2007; Zhang, 2013 and others
Relational Capital or Social Capital The goodwill resulting from physical and virtual exchanges and interaction between like-minded people, willing to share ideas, creating trust and quality knowledge to drive enhanced decision-making and action. This is also a strong source of advantage due to niches.	Organisational external relationships with customers, suppliers, partners, stakeholders and their perceptions of the organisation and abilities to collaborate and resulting goodwill. This is mostly tacit knowledge.	Petrash, 1996; Seemann, *et al*., 2000; Zhang, 2013 and others
Structural Capital The residual knowledge when people are removed from the organisation.	Organisational routines, policies, doctrine, structures, processes, procedures, systems, databases, culture and IP (patents, trademarks, copyright). This is mostly explicit knowledge.	OECD, 1996; Petrash, 1996; Steward, 1997; Edvinsson & Malone, 1997 in Kakabadse, *et al*., 2003; Seemann, *et al*., 2000; Neilson, 2001; Zhang, 2013 and others

Adapted from Seemann, *et al*. (2000: 2 and 3) and La Grange (2006: 6). See also Malhotra (2003) to acquire a national/country perspective.

Without labelling it IC, Davenport and Prusak (1998: 5) in Marshal (2007: 4-5) stated – "Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight [human capital] that provides a framework for evaluating and incorporating new experiences and information. [Also in De Nadae & Monteiro de Carvalho (2017: 351)] It originates and is applied in the minds of knowers [human capital]. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms [structural capital].".

Zaim, Tatoglu and Zaim (2007: 55) state along the line of IC - "It is because knowledge is a context-dependent social concept (Lang, 2001 [and BenMoussa, 2009]) and a large part of organizational knowledge is embodied in social processes, institutional practices, traditions and values (Fayard, 2003; Boisot, 1998).".

[22] Seemann, *et al*., 2000; Spender and Marr, 2005; La Grange, 2006; Zhang, 2013.
[23] Nonaka, Toyama and Konno (2000: 19) defined 'ba' as …"the context shared by those who interact with each other, and through such interactions, those who participate in ba and the context itself evolve through [sic] self transcendence to create knowledge. Participants of ba cannot be mere onlookers. Instead, they are committed to ba through action and interaction". Baqir and Kathawala (2004) states that 'ba' is the Japanese word for place or platform.

Skills referred to as part of human capital should be clarified further. Adam Smith in 'The Wealth of Nations' reiterated the criticality of employee skills as a multiplier for growth (OECD, 1999). Since then academics postulated that it is T-shaped skills that are most valuable to organisations (Berraies, Chaher & Ben Yahia, 2014). T-shaped skills are defined as - "… skills [that] enable their possessors to explore the interfaces between their particular knowledge domain and various applications of that knowledge in particular products" (Leonard-Barton, 1995 in Yadav & Singh, 2013: 196). Thus, T-shaped skills require appropriate organisational culture, leadership, structure and IT to facilitate knowledge creation, flow and sharing to enhance knowledge interfaces between domain- and application knowledge. This introduces KM Critical Success Factors (CSF) that are discussed later in the dissertation.

Petrash (1996) posits that interaction delivers financial value and expanded space for value-creation (Holsapple & Joshi, 1999: 3). Increased integration; more value. This is a typical business perspective. The value creation space corresponds well with the notion of 'ba' of Nonaka. In the public sector, the value might be in terms of service delivery satisfaction or from a military perspective – such as deterrence, safety and security. Value can also be exchanged with advantage which, in turn, will result in greater value as an effect. These are important aspects for consideration when defining knowledge as a construct for the SA DOD. Petrash[24] (1996) depicts the interaction of the various streams of IC in the following manner:

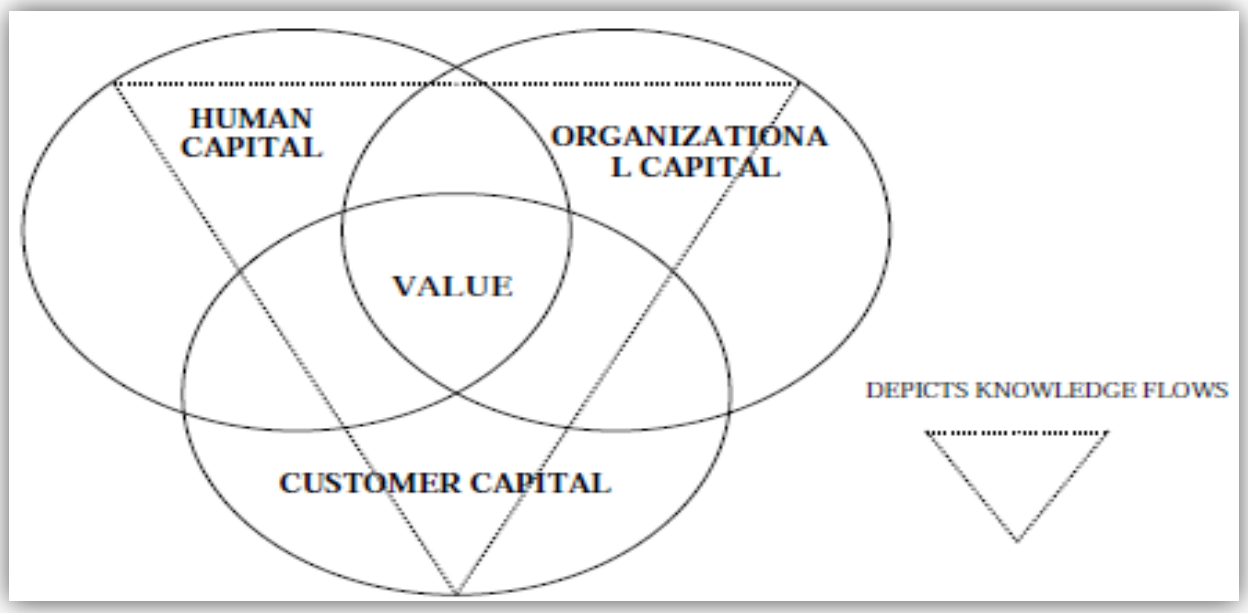


Figure 2.4: Intellectual Capital Model

Source: Petrash (1996) in Holsapple and Joshi (1999: 11).

Most importantly, there is a dynamic process of interaction between the three IC elements, which is congruent to the dynamic nature of knowledge and a response to competitiveness and organisational priorities, resulting in an - "… evolving mix of knowledge assets" (Seemann, *et al.*, 2000: 7). Variations in combinations of IC elements will result in different knowledge attributes –

[24] "This framework has been collectively developed by Leif Edvinsson, Skandia; Hubert Saint Onge, Canadian Imperial Bank of Commerce; Patrick Sullivan, Intellectual Capital Management; and Gordon Petrash, Dow Chemicals." (Holsapple and Joshi, 1999: 3)

discussed below. The introduction of the evolving nature of knowledge is very important considering the complex and dynamic nature of the environment.

From a military perspective, the only aspect that is possibly different is the KM processes, organisational objectives and external impact resulting from the use of IC. The conceptual links between the different IC components in the Intellectual Capital Statement Structural Model (see Figure 2.20) are generic enough for application in the military environment.

Seemann, *et al*. (2000: 5) is of the opinion that IC and KM are not interchangeable constructs. Knowledge management is posited as being more operational in nature, following –"… strategic decisions about which elements of [IC] to invest in.". The researcher agrees. IC in all its complexity is the organisational resource central to KM. It consists of evolving meaning and understanding in both tacit and explicit formats. Relational capital is possibly better explained by its intangibility than tacitness.

Sveiby (1997) in Holsapple and Joshi (1999: 11) equates IA to knowledge. Quintas (2002) in Alrubaiee, *et al*. (2015: 991) states that knowledge is possibly the most important form of IA. Business organisations lead the advance in recognising the importance of IA management (Halawi, Aronson and McCarthy, 2005). The Intangible Asset Framework (Sveiby, 1997) elaborates on what is regarded as IA, noting that the External Structure closely resembles Relational IC, Internal Structures resemble Organisational IC and Employee Competence that of Human IC -

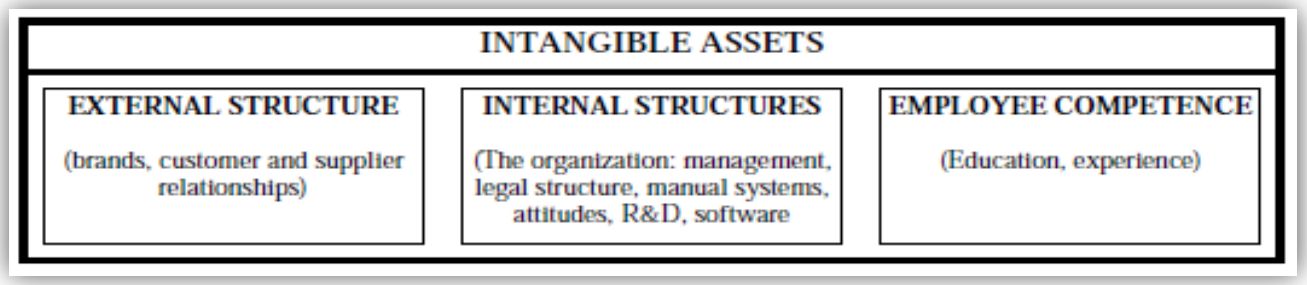


Figure 2.5: Intangible Asset Framework

Source: Sveiby (1997) in Holsapple and Joshi (1999: 11).

Chong, Holden, Wilhelmij and Schmidt (2000) in Halawi, Aronson and McCarthy (2005: 75) state that - "The development of brands, stakeholder relationships, reputation and the culture of the organization is readily viewed as providing sustainable sources of business advantage". These aspects are associated with IC and thus knowledge. IC thus has strong links with the construct of advantage. Andriessen (2004: 63) in La Grange (2006: 6) describes the IA typology from an accounting perspective as - "… a subset of [IC]" and defined as an - "… identifiable non-monetary asset without physical substance held for use in the production of supply of goods or services, for rental to others or for administrative purposes". This definition identifies 'the right to use' certain knowledge assets, for example, software or a patent and trademark. Intangible assets as a construct were created for organisations to be able to attribute an accounting value to assets that do not have physical substance, following an objectivist approach whereas the IC construct incorporates both objectivism and relativism.

Boisot (1998: 3) in Malhotra (2003: 2) offers another objectivist-type definition of knowledge assets – "… stocks of knowledge from which services are expected to flow for a period of time that may be hard to specify in advance.". This definition is also closely related to IA. The definition is very relevant to public service because it is coupled to services rather than products; services being the primary deliverable of public service. For the military that service would typically be defence and security and other related activities.

Therefore, knowledge can be understood as being tacit, explicit and intangible all of which are integrated into the IC construct, which, from an organisational perspective aims at value creation and advantage. Another very simple and useful classification of knowledge was adopted by the OECD in 1996. The classification corresponds closely with the notion of getting the correct knowledge to the correct people at the correct time. The OECD (1996: 12) articulated their views of knowledge as follows -

> "In order to facilitate economic analysis, distinctions can be made between different kinds of knowledge which are important in the knowledge-based economy: know-what, know-why, know-how and know-who. Knowledge is a much broader concept than information, which is generally the "know-what" and "know-why" components of knowledge. These are also the types of knowledge which come closest to being market commodities or economic resources to be fitted into economic production functions. Other types of knowledge, particularly know-how and know-who, are more "tacit knowledge" and are more difficult to codify and measure (Lundvall and Johnson, 1994).".

Kipling first used these six factors for analysis in a poem and called them "six honest men" –

"I keep six honest serving-men (They taught me all I knew);
Their names are What and Why and When
And How and Where and Who." (Kipling, 2005 and Clayton, 2006)

These factors are posited to be, originally, - "… a medieval Latin epigram in the Register of Daniel Rough, Clerk of Romney (Kent) in the 14th century:

Si sapiens fore vis sex servus qui tibi mando
Quid dicas et ubi, de quo, cur, quomodo, quando.
(If you wish to be wise I commend to you six servants,
Ask what, where, about what, why, how, when.)" (Lewis, 2005: 226)

The '*who-what-why-where-when-how*' and now also, *what thereafter* method of analysis and supporting decisions, actions and effects (as was used as early as the 14th century) are well known by militaries worldwide. Savage (1996) and Foray and Lundvall (1997) in Zhang (2013: 14) state these as follows - "… know-what (knowledge about truth), know-why (scientific theory of principal and regular pattern), know-how (skills and capabilities for doing something), know-who (who knows and who has what kind of knowledge) [Foray & Lundvall, 1997 and King, 2009] … know-where (right place) and know-when (right time) [Savage, 1996]". Categorising types of knowledge in this way is very close to methods used to give orders and describe situations within militaries. Militaries worldwide use the 'who-what-where-when-how-what thereafter'-rhyme to ensure proper description of the situation and possible action to be taken. The '*what thereafter*' is added due to its predictive value and/or providing a feedback loop to learn from which informs the next cycle of

activity. Another 'w' that should be added to the rhyme is '*which effect*' is sought. The construct of 'which effect' then links the various elements of knowledge to the military construct of 'effect' as described by Effects-Based Operations. "[T]heories of effects-based operations share some common ground. Each starts with an emphasis on the importance of knowledge, knowledge of the enemy, viewed as a complex adaptive system, and knowledge of self." (Batschelet, 2002: 3). Knowledge is considered to be a primary driver in the military Effects-Based Operations cycle below -

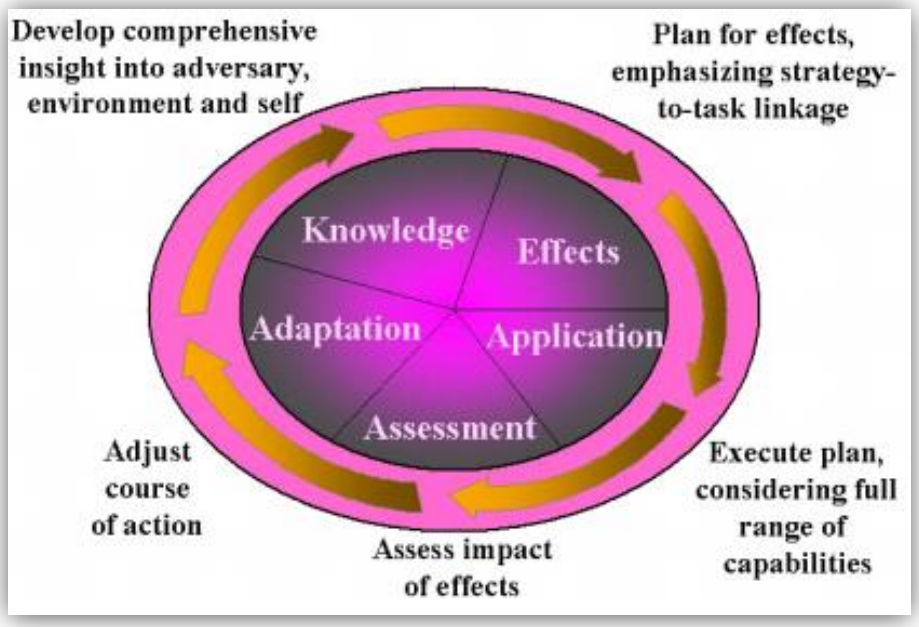


Figure 2.6: Effects-Based Operations Cycle

Source: Deptula (2001) in Batschelet (2002: 3).

Davis (2001: 17) provides the following elementary description of what military effects can constitute:

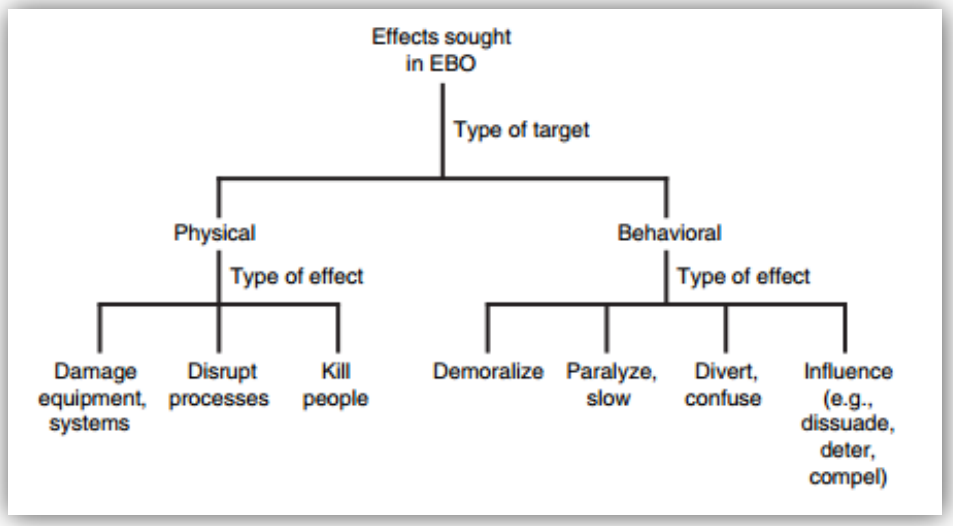


Figure 2.7: A Simple Taxonomy and Some Examples of Effects-Based Operations[25]

Source: Davis (2001: 17).

This is obviously a non-exhaustive list in figure 2.7 above. Other military effects are freedom of decision and action. Need it be said that these effects are very different from those that business seeks to achieve with the application of knowledge; but necessary nonetheless to achieve national security and other operational objectives. For businesses effects could be for example - dominate, block, capture, disrupt, flood markets, fix prices, slow down growth, etc.

Each fragment of data/information describing each component of the rhyme ('who, what, where, when, why, how, which effect and what thereafter') builds towards decision-quality and actionable pieces of knowledge about the past, current and future - enabling decisions, actions, effects and possibly unlocking advantage. Each fragment provides more context to the other available fragments of information, which, as a whole constitute knowledge. Davenport and Prusak (2000: 5) state frankly regarding the relationship between decisions, actions and knowledge – "One of the reasons that we find knowledge valuable is that it is close - and closer than data or information - to action. Knowledge can and should be evaluated by the decisions or actions to which it leads.". This is a critical statement for consideration in the definitions of knowledge and KM and a future SA DOD KMC. In other words, the definitions should express on what these constructs are useful for.

Then there are the three-way categorisation by Sandkuhl, Smirnov and Henoch (2005) in Zhang (2013: 16) dividing organisational knowledge into -

> "… competencies of employees (e.g. personal skill profiles), 2) externalized knowledge (explicit knowledge stored electronically in documents, databases or information systems, e.g. office documents, or formal requirement specifications from the customer), 3) corporate knowledge (tacit knowledge represented in work processes, organizational structures, standard operating procedures, or best practices) [Billig & Nentwig (2003) and Lang & Pigneur (1999)].".

These categories outlined above and conceptualised by various authors are very similar to IC in Seemann, *et al*. (2000) and La Grange (2006) – table 2.1 above. It contributes to a very useful and simplistic structure to describe what types of knowledge should be managed by the SA DOD and also suggest a requirement for different management initiatives.

Knowledge has several attributes with which it can be calibrated/organised/sorted. The training material of 2014 (module 5, slide 8) of the Knowledge Management Institute™ (KMI)[26] list what it considers knowledge attributes. When considering the nebulous conceptual and definitional aspects attributed to knowledge as a construct, there is a requirement for more practical

[25] "[Effects-based operations] are defined here as operations conceived and planned in a systems framework that considers the full range of direct, indirect, and cascading effects - effects that may, with different degrees of probability, be achieved by the application of military, diplomatic, psychological, and economic instruments." (Davis, 2001: xiii) For example, "During the war some Iraqi power plant managers shut down their electric plants to avoid targeting thereby creating our desired effect without exposing Coalition members to danger, and freeing up air resources for another task—Sun Tzu's dictum fulfilled." (Deptula, 2001: 12)

[26] The Knowledge Management Institute ™ (KMI) based in the USA is a globally recognised training institute. What makes KMI particularly relevant to this research is the fact that the USA military makes extensive use of the KMI to train its personnel on KM. The KMI also recognise some of the USA military's KM principles in the training material.

understanding. This requires discussion about knowledge attributes to understand what types of knowledge to be managed. The KMI list the following knowledge attributes – "… age, applicability [why], actionability [what], clarity [who, -what,- where, -when, how, what thereafter], domain [what], flows [where], importance [why], location [where], meaningfulness [why], measurability, modes (explicit or tacit) [where], perishability, practicality, proficiency, relevance [why], stocks, states, source [who or where], types [what], usability, utility, validity (empirical or not), velocity (of the information-knowledge conversion process), viscosity (the density) and volatility (in dispute or not).".

Table 2.3 is an adaptation of Table 2.2 above with a juxtaposition of the 'who, what, where, when, why, how, which effect and what thereafter' approach to knowledge and related questions generated by the researcher for illustrative purposes and a short conclusion on each component of IC. Let us juxtapose IC and the who, what, where, when, why, how, which effect and what thereafter way of thinking about knowledge –

Table 2.3: Intellectual Capital and the Who, What, Where, When, Why, How, Which Effect and What Thereafter Rhyme

IC Component	Who, What, Where, When, Why, How, Which Effect and What Thereafter
Human Capital The correct talent at the right time. Individual capabilities, -knowledge, -skills and - the experience of employees. This is mostly tacit knowledge.	• Who has the talent, capabilities, knowledge, skills and/or experience? • What talents, capabilities, knowledge, skills and/or experience are required? • What talents, capabilities, knowledge, skills and/or experience are available? • Where must these talents, capabilities, knowledge, skills and/or experience be available and applied? • When are the talents, capabilities, knowledge, skills and/or experience required? • How can these talents, capabilities, knowledge, skills and/or experience be applied? • Which effect will these talents, capabilities, knowledge, skills and/or experience enable? • What will happen or is required after the talent was used?
Knowledge about the individual or group of individuals and their knowledge, both human- and relational capital.	
Relational Capital or Social Capital The goodwill resulting from physical and virtual exchanges and interaction between like-minded people, willing to share ideas within groups with shared interests. Creating trust and quality knowledge to drive enhanced decision-making and action. This is also a strong source of advantage due to niches. Organisational external relationships with customers, suppliers, partners, stakeholders and their perceptions of the organisation and abilities to collaborate. This is mostly tacit knowledge.	• Who has the right relationships? • What relationships are available and/or required? • Where must these relationships be available and applied? • When are the relationships required? • How can these relationships be applied? • Which effect will relationships enable? • What will happen or is required after the relationships were used?

IC Component	Who, What, Where, When, Why, How, Which Effect and What Thereafter
Knowledge about relevant and available relationships and networks that could possibly unlock more human capital.	
Structural Capital The residual knowledge when people are removed from the organisation. Organisational routines, policies, doctrine, structures, processes, procedures, systems, databases, culture and IP (patents, trademarks, copyright). This is mostly explicit knowledge.	• Who has access to or manages organisational knowledge? • What organisational knowledge is available and/or required? • Where can this organisational knowledge be found and where must it be applied? • When must the organisational knowledge be available and applied? • How can the organisational knowledge be applied? • Which effect will the application/non-application of the organisational knowledge bring about? • What will happen after the application/non-application of the organisational knowledge?
Knowledge about the organisational (routines, policies, doctrine, structures, processes, procedures, systems, databases, culture and IP) required to manage operations, human- and relational capital.	

Table 2.3 above illustrates the usefulness of both these constructs as well as their complementarity in the quest of finding the components of knowledge as a construct. It goes well with the statement of Davenport and Prusak (2000: 7) –

> "Knowledge is not a rigid structure that excludes what doesn't fit; it can deal with complexity in a complex way. This is one essential source of its value. Although it is tempting to look for simple answers to complex problems and deal with uncertainties by pretending they don't exist, knowing more usually leads to better decisions than knowing less, even if the "less" seems clearer and more definite [such as data and information]. Certainty and clarity often come at the price of ignoring essential factors.".

Changes that occur in each knowledge attribute due to changes in the environment drives the dynamic nature of knowledge, resulting in constantly evolving meaning and understanding, or new knowledge. Seemann, *et al*. (2000: 5) describes knowledge as being - "… continually in motion, being enhanced, shared, sold, or used, and that they generate superior business results.".

With the need for-, types of-, time value of- and attributes of knowledge in mind, let us supplement the definitions in Table 2.1 with some more practical definitions for knowledge as a construct in order to progress towards the construction or adoption of a proposed SA DOD knowledge definition and eventually KM. Kuhn (1970) in Kakabadse, *et al*. (2003: 79) states that - "Human knowledge is subjectively determined by a multitude of factors, exemplified by pedagogical, socio-economic, cultural and psychological issues as well as language and context – most of these operating unconsciously" – *ipso facto* resulting in diverse collections of knowledge definitions. This predicament makes KM very nebulous. In agreement with Mortensen (2014: 7),

there are probably as many definitions of knowledge as there are academics, philosophers, practitioners and organisations.

Pérez-Montoro (2004: 2) proposed that a definition of knowledge should be - "… conceptually consistent and pragmatically useful". The definition should be focussed on the identification of real knowledge assets; enable easy application and make an unambiguous distinction between data, information and knowledge. This recognises the predicament earlier mentioned that the knowledge hierarchy construct has cross-over spaces between the constructs that are undefined. Pérez-Montoro (2004: 2-4) provides the following criticism, some of which are also found in Bouthillier and Shearer (2002) -

> "From the perspective of [KM] and Information Science, for instance, some authors (Nonaka, 1991; Nonaka and Takeuchi, 1995; Davenport, 1997; Davenport and Prusak, 1998; Boisot, 1998; Devlin, 2001; Sveiby, 1999; or von Krogh, Ichijo, and Nonaka, 2000; among others) have dealt with this problem [i.e. defining knowledge], but producing no clear results … in [KM] there is a peculiar conceptual sloppiness in the treatment of a basic distinction that sustains the conceptual structure of the discipline, namely, the distinction between such concepts as Data, Information and Knowledge.".

Because this distinction is extremely subjective, the researcher is proposing a knowledge continuum rather than a knowledge hierarchy, based on the Wiig (1997) definition of knowledge used earlier in the dissertation. The researcher reviewed a number of definitions in order to propose a definition for this dissertation. Based on the Pérez-Montoro (2004) requirement for '*consistency and utility'*, the KMI definition of knowledge (2014, module 5, slide 20) is a good starting point. KMI defines knowledge as - "… understanding gained from experience, analysis and sharing". This definition points to useful core processes required to gain knowledge, i.e. 'understand, experience, analysis and sharing'. The definition essentially equates knowledge to understanding. Understanding implies that it is more than data and information, however, the definition does not elaborate on why this is necessary and also not to the dynamic nature of knowledge as discussed earlier in the paper.

Van Der Spek and Spijkervet (1996) in Uit Beijerse (1999: 102) define knowledge as a - " ... dynamic human process in which 'truth' is created". This definition acknowledges elements of the philosophy of Plato. Plato described knowledge as "justified true belief"; a definition that evolved into an authoritative position amongst western philosophers[27]. However, speaking of 'truth' and what it exactly is, now and in the future and in different social and cultural settings is not very helpful. Organisations do not manage 'truth' but rather IC – *which possibly contain truth*. In the military (and probably also business), certain knowledge is created that holds no truth and are designed to deceive the opponent. It is knowledge nonetheless. Therefore, the researcher does not believe that knowledge has to be true for it to be known.

Pérez-Montoro (2004) criticises the usefulness of Plato's definition from various perspectives, concluding that it offers limited knowledge identification power or ecological value (i.e. construct differentiation). The researcher agrees. A 'dynamic human process' implies that knowledge is in

[27] Nonaka & Takeuchi, 1995; Von Krogh, Ichijo and Nonaka, 2000; Sveiby, 2001; Kakabadse, *et al*., 2003; Zhang, 2013.

constant flux due to certain processes and changing attributes as well as that people are the foci. This conceptualisation is useful in determining KM requirements. It is also useful from a definitional perspective pointing to the evolutionary nature of knowledge as a requirement for the complex nature of the contemporary world.

Knowledge management requires both process and people. The 'human' part of knowledge also points to an important aspect of the being of knowledge – that it remains inherently in people or tacit knowledge (Polanyi, 1958) - "… defined as action-based, entrained in practice, and therefore cannot be easily explained or described, but is considered to be the fundamental type of knowledge on which organizational knowledge is built (Nonaka & Takeuchi, 1995; Choo, 1998a)" (Bouthillier & Shearer, 2002: online). This statement acknowledges the fundamental nature of knowledge and states a critical attribute of knowledge, namely action (acknowledged by the KMI knowledge attributes above).

Based on the conception of Polanyi (1958) and Wittgenstein (1995) in Sveiby (2001: 2), knowledge is the - "… capacity to act". Sveiby (2001: 2) states that - "Knowledge defined as "capacity to act" is dynamic, personal and distinctly different from data (discrete, unstructured symbols) and information (a medium for explicit communication).". Bennet, Bennet and Lee (2010: 316) support the idea of knowledge being an enabler to act within contextual space.

Wiig (1993) in McNabb (2007: 45), supported by Malhotra (2000) and Allee (2003) in Musimwa-Makani (2012: 25) produced an explanation rather than a concise definition – including whispers of the Plato definition ('truths and beliefs'), acknowledging that knowledge is more than information and data -

> "Knowledge consists of facts, truths, and beliefs, perspectives and concepts, judgments and expectations, methodologies and know-how [this conforms to what 'meaning' is according to Sveiby (2001)]. Knowledge is accumulated and integrated and held over long periods to be available to be applied to handle specific situations and problems …".

The Wiig-definition above unpacks some of the 'dynamic human process' proposed by Van Der Spek and Spijkervet (1996) and 'knowledge flow' proposed by Kakabadse, *et al*. (2003). These are all elements required to create 'meaning,' as suggested by Sveiby (2001). Defining knowledge in this manner is perilous because the question always lingers whether it is a finite list of descriptors. From a practical perspective, the definition does not state what the knowledge is for. Certainly, knowledge is not just there for 'specific situations and problems' but surely to enable all decisions and actions of the organisation in order to manage all situations, risks, problems and advantage. More discussion on the required elements for KM follows later in the chapter.

Davenport and Prusak (1998: 5) define knowledge as - "… a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information". This is closely related to the Wiig-definition in the spirit of interpretivism, touching on tacit knowledge elements *ala* Polanyi but also eludes to the dynamic nature of knowledge *ala* Van Der Spek and Spijkervet (1996) in Uit Beijerse (1999: 102).

Seemann, *et al*. (2000: 7) states - "Executives must view [KM] as a dynamic process where priorities will change in response to the demands of the competitive environment and to the

organization's evolving mix of knowledge assets". Various writers[28] support the idea of knowledge as a 'dynamic human process'. Knowledge as a 'dynamic human process', as identified above, provides a possible explanation to the notion of 'more than information' by coupling it to people attributes (e.g. truths, and beliefs, perspectives, judgments and expectations and know-how) that will first generate tacit knowledge before KM processes will construct explicit knowledge in the form of structural capital. It also refers to the changing nature of knowledge, i.e. a possible evolutionary process. Thus, where information is perceived as a static construct, knowledge is perceived as a moving or perhaps evolving construct, as stated earlier. Note also that for this reason KM is also perceived as dynamic and evolving.

The construct of 'meaning' described by the Wiig-definition earlier is supported by academics such as Sveiby (2001) and Spender and Marr (2005) and is in contrast to knowledge perceived as an object (objectivism) as described in Spender and Marr (2005). Knowledge as an object proposes that knowledge can be separated from the knower and then treated as artefacts of economic assets such as IC. In the objectivist's view, knowledge as an object equates knowledge to facts (Spender & Marr, 2005) making it very static - "… in the objectivist framework the knower adds nothing to the data, which can, therefore, be known 'objectively' without considering the knowing subject" (Spender & Marr, 2005: 5). This is typically a second generation KM perspective and closely conforms to positivism (Spender & Marr, 2005: 8) in the sense that an economic value for knowledge could be calculated because of the objective approach to identifying and/or defining the asset. These perspectives only address knowledge as an economic object and possibly ignoring intangible values such as the military value of knowledge.

The knowledge that cannot be separated from the knower (i.e. tacit knowledge, human faculties or intelligence and wisdom) will pose a variety of management challenges to the organisation that sets out to manage knowledge. Knowledge as an object is really reduced to explicit KM. If the organisation also aims to manage the knowledge still not codified or 'objectified'; it will possibly result in human resource management-, organisational culture- and leadership challenges because the individuals with the knowledge might feel that the organisation view its employees as objects and not as unique individuals.

Knowledge as 'meaning'- based on the construct of understanding[29]- presumes that the knowledge cannot, in essence, be separated from the knower but that meaning will evolve over time as new data, information and other knowledge becomes available and are internalised. This constant input of new data, information and other knowledge creates new understanding (based on the Weber-notion of "verstehen" - German for 'understanding'), thus allowing the meaning or tacit knowledge to evolve, broadening the portfolio of required or optional decisions to be taken, and constantly opening up new options for action. This is largely an interpretivist approach to knowledge (Spender & Marr, 2005: 9), i.e. - "Knowledge assets are seen as data [and information] combined with the meaning that would allow organizations to use it as a factor of production [or for military purposes]". This approach has its own challenges from a KM perspective. However, the approach at least acknowledges that tacit knowledge also needs managing following the Interpretivism school of thought, Interpretivism being a third generation KM perspective.

[28] Polanyi, 1966 & 2009; Nonaka *et al*., 2000; McInerney, 2002; Wang, 2008; Zhang, 2013.
[29] Sveiby, 2001; Spender & Marr, 2005; and Bennet, Bennet and Lee, 2010.

Wittgenstein in Spender and Marr (2005: 5) –

> "… argues that it is not possible to write explanations that do not ultimately depend on some sources of meaning lying [*sic*] beyond the reach of such explanation. In the same way we see communication always requires the receiving person to have some prior knowledge (absorptive capacity) that cannot be made part of the signal sent.".

Also –

> "… in the interpretivist frame, knowledge is determined by some combination or melding of the phenomena to be known and the knower. Typically the knower is described in terms of the source/s of meaning that individuals attach to the phenomena since such meaning is under-determined by the phenomenon itself. Thus some writers speak of the 'lenses' through which people view events, data, and other phenomena." (Spender & Marr, 2005: 5).

These 'lenses' can be construed as the processes involved to create meaning or knowledge and with which that knowledge is then managed to create new meaning, understanding and upon which decision and actions are based.

Then Spender and Marr (2005: 9) also suggest the existence of an organic approach to understanding knowledge owned by organisations; i.e. - "... a dynamic and tentative combination of data, meaning, and the ability to generate proficient practice". Again, acknowledging knowledge to be managed; this view closely relates to the view that knowledge is a 'dynamic human process', keeping knowledge in constant flux.[30] The construct of knowledge as IC is also easily identifiable. The researcher is of the opinion that meaning can also evolve in explicit knowledge based on the updating of organisational IC as new data/information/knowledge becomes available. Such evolution is based on tacit knowledge evolution and inevitably will be more iterative and slow. This will then assist with understanding the new set of circumstances and requirements and subsequent decisions and actions. Still considering definitions for knowledge; Riempp and Smolnik (2007: 4) contribute a shorter version of a combination of the same elements -

> "Knowledge is the entire body of know-how and skills which people apply to solve problems. This includes theoretical know-how as well as practical everyday rules and procedures. Knowledge is based on data and information but, unlike them, is always person-specific. Knowledge is created as an individual process within a specific context and manifests itself in actions.".

This definition acknowledges elements of previously stated definitions; also points to the fact that knowledge is more than just an object (i.e. know-how and skill) and aims at facilitating decisions, actions and an effect (i.e. problem solved). There are also murmurs of IC in the definition. This definition combines elements of the interpretivist and organic approach to knowledge.

Shariq (1997: 75) defines knowledge as - "… the embodiment of human intellectual capital and technology". This raises the question about the other forms of IC (relational and organisational). Shariq does not state the role of technology. In the writer's opinion certain parts of

[30] Van Der Spek and Spijkervet, 1996; Uit Beijerse, 1999; Seemann, *et al*., 2000; Nonaka *et al*., 2000; Sveiby, 2001, Kakabadse, *et al*., 2003; Zhang, 2013.

technology may well be knowledge (such as designs and software for example). However, not every part of technology equates to knowledge. Technology as knowledge seems to be in line with the objectivist approach. Shariq does not hint at the possibility that knowledge could be in a constant state of flux, which both human IC and technology invariably are. Shariq also doesn not state the purpose of the knowledge in the definition.

From a more practical perspective, Mertins and Seidel (2009) in Zhang (2013: 13) classify knowledge into domains - "… knowledge of markets and competitors, knowledge about norms, standards, & rules, knowledge about products, knowledge about customers, knowledge about one's own organization, knowledge about a partner, knowledge about patents, and knowledge about profession & methods". Based on these domains there is also a two-dimensional approach, i.e. personal or organisational knowledge (Zhang, 2013). These definitions seem to aim at the source of knowledge. These domains or sources of knowledge are based on a typical business view of an organisation, but can also be very useful to deconstruct the knowledge domains for military organisations. The domains also display certain elements of IC as discussed above. This is discussed later in the dissertation in order to contribute to the question; *what type of knowledge should the SA DOD be managing?* The discussion above contributes to the crafting of a definition for SA DOD knowledge in order to clearly understand the asset to be managed and SA DOD KM.

The definitions discussed in this section thus far support the view that knowledge is inseparable (interpretivist and organic approaches) from people and organisations as embodied by the IC construct. This is also the distinct view of Habermas, 1972 and Lytras and Poudouli, 2006 and others. Another dimension acknowledges the presence of knowledge in technology and science (objectivist approach) (Shariq (1997, McAdam & Reid, 2000 and others). The behaviour and unique challenges coupled to people, organisations and technology can be controlled and managed within reason. However, to accomplish this, a dedicated management paradigm must be in place. For this KM is proposed by several academics and practitioners alike.

Organisational knowledge creation requires creative, evolving and integrated processes for organisations to remain relevant or competitive. Knowledge in itself does not require decision or action. However, decision and actions require knowledge in order to progress in a particular direction, to deliver specific effects or to create and sustain advantage. Organisations need to continuously establish new meaning to understanding the complex and dynamic worlds they find themselves in. This can be facilitated through KM, its processes and enablers. Following from the above, the next section discusses KM theory in support of the crafting of SA DOD knowledge and KM definition proposals in later chapters. Let us now consider the theory and practice supporting KM.

2.4 THE MANAGEMENT OF KNOWLEDGE: AN INTRODUCTION

There is a considerable divergence on the perspectives of what constitutes KM (Halawi, *et al*., 2005 and Shajera & Ahmed, 2015) – stemming from the antediluvian debate about the nature of knowledge. However, the coining of the phrase 'knowledge management' by Wiig in 1986 at the United Nations provided some focus. This was followed by the first handbook on KM published by Wiig in 1993 (Bouthillier & Shearer, 2002). Knowledge management did not evolve in a criticism

vacuum. Knowledge management critics (Sutton, 2007 in Onyancha and Ocholla, 2009: 1) states that -

> "KM does not appear to possess the qualities of a discipline. If anything, KM qualifies as an emerging field of study. Those involved in the emerging field of KM are still vexed today by the lack of a single, comprehensive definition, an authoritative body of knowledge, proven theories, and generalized conceptual framework. Academics and practitioners have not been able to stabilize the phenomenon of KM enough to make sense of what it is and what it comprises.".

Another very radical stance is that of Stacey (2001: 220) in La Grange (2006: 22) – "… knowledge cannot be grasped, owned by anyone or traded in any market … it is not only impossible to manage knowledge, even the question makes no sense.". Stacey was clearly not thinking when he wrote this. If knowledge cannot be grasped then surely not much progress would have been possible. Every individual and organisation own knowledge to some degree, the more secret the knowledge the more secure the ownership (or control); the formula for Coke is a case in point. Knowledge is traded every day in the marketplace when considering what is included in IC.

Riempp and Smolnik (2007: 4) state that knowledge, being perceived as specific to and embedded in people, are "… partly conscious … invisible and not directly transferable". This might be true at a subconscious level but not at the explicit level where knowledge can be imparted in voice message communication, typed or written format.

Streatfield and Wilson (1999) in Bouthillier & Shearer (2002) are of the opinion, based on an over-simplification of the nature of knowledge, that the management of knowledge inherent in human minds (tacit knowledge) is questionable. It is, of course, a general statement referring to other people or organisations managing tacit knowledge. The individual himself manages that knowledge. Other individuals and organisations do not have to manage the knowledge itself but just needs to manage the individual that is perceived to have that knowledge in such a manner that this knowledge becomes available (explicit) in a desired form or format. That is KM.

In the researcher's opinion and the academic work of a myriad of other authors, these authors possibly oversimplified the criticism. For example, if there is disagreement by thousands of people on the exact shade of a red car, it does not mean that the car is not red. The real asset, i.e. the car, is also not diminished in terms of capability or value by the fact that there is disagreement on the exact shade of the colour. Therefore, to state that the car does not possess the qualities of a car is absurd and that the car cannot be grasped, owned by anyone or traded in any market or that the car is impossible to be managed based on disagreement about the shade of the colour reflect possibly a poor understanding of the phenomenon.

The poor understanding of the phenomenon of knowledge and its management is exacerbated by its intangibility and ability to evolve. Thus academics and practitioners alike that requires quantification of a phenomenon to be able to understand them and manage them will have great difficulty with KM. Also lacking is the capacity to understand that the management of intangible phenomenon invariably requires the management of the host or the surrounding environment to exploit its advantages and to apply and benefit from them. For example - oxygen is a case in point. The mere fact that scientist could not see, grasp, own or manage oxygen did not prevent them from managing possible originators of oxygen and capturing the oxygen for later use. That is oxygen

management, currently at the international strategic level of management, i.e. global warming and greenhouse gasses. Knowledge is very similar. It exists, evolves, can be grasped, owned and leveraged in the marketplace and if not managed and secured carefully can result in a catastrophic disaster (enrichment of radioactive material as an example). From a positive perspective, it can lead to cataclysmic benefits (a cure for HIV/AIDS or cancer as examples). Knowledge security in this sense covers both explicit knowledge and those individuals with tacit knowledge not yet imparted. Thus, let us get back to arguments and evidence on how to manage knowledge because of the evident reliance by society, business and militaries on it. Popa (2010: 57) states –

> "Since our society relies so much on knowledge a new type of management appeared: knowledge management [coined by Wiig in 1986]. There's no universal definition of knowledge management, just as there's no agreement as to what constitutes knowledge in the first place, this is why the best way is to look at knowledge management in the broadest context. Succinctly put, knowledge management is the process through which organizations generate value from their intellectual and knowledge-based assets.".

2.4.1 Multi-disciplinary by Nature

Knowledge management as a management science is influenced by and constructed from various academic disciplines – and thus correctly considered to be an integrated multi- and interdisciplinary field of study and application. This gives rise to as many theories and models as there are theorists and practitioners[31]. The conceptual and terminological confusion is compounded by the variety of - "paradigmatic approaches" to KM (Hall, *et al*., 2007: 2), which can be based on technological designs (typically in the spirit of information technology management) and/or non-technological designs (Mertins, *et al*., 2001 in Zhang, 2013).

Onyancha and Ocholla (2009: 2) assist with understanding why KM is considered a multi-disciplinary field of study by listing some of the most prominent disciplines contributing to KM theories and models - "… computer science; business; management; library and information science; engineering; psychology; multidisciplinary science; energy and fuels; social sciences; operation research and management science; and planning and development.". Their view is based on the work of several writers[32]. There are numerous academic philosophies that influence KM (Kakabadse, *et al*., 2003) - consider the following table -

Table 2.4: Academic Philosophies that Influences Knowledge Management

Discipline	Contribution
Philosophy	Defining knowledge
Cognitive Science	Understanding knowledge workers
Social Science	Understanding motivation, people, interactions, culture, environment
Management Science	Optimisation of operations and integrating them into the enterprise
Information Science	Building knowledge-related capabilities
Knowledge Engineering	Eliciting and codifying knowledge

[31] Newman and Conrad, 1999; Kakabadse, *et al*., 2003; Halawi, *et al*., 2005; Onyancha and Ocholla, 2006; Hall, *et al*., 2007; BenMoussa, 2009; Onyancha and Ocholla, 2009; Onyancha, 2011, Bartczak & England, 2005; and Zhang, 2013.
[32] Ponzi, 2002; Chaudhry, 2005; Jacobs, 2004; Onyancha and Ocholla, 2006; Grossman, 2007; Sutton, 2007; Roknuzzaman and Umemoto, 2008; Hazeri, Martin and Sarrafzadeh, 2009; Hazeri and Martin, 2009.

Discipline	Contribution
Artificial Intelligence	Automating routine and knowledge-intensive work
Economics	Determining priorities

Adapted from Kakabadse, *et al*. (2003: 79).

The scope of these highlights the requirement for coherence and integration in KM. Zhang (2013) is of the opinion that the current, primary KM theory development focus is in IT and people, which is a combination of the technology (computer science, library and information science) and behaviour schools of thought (social science, management science and psychology). This probably exacerbates the understanding by people and within organisations that KM is the equivalent of IM and/or the management of IT.

Then there is the integration of KM and strategic management, based on strategic thinking and the Resource-Based View of the organisation (management sciences and social sciences); positing KM as the ultimate strategy to unlock or enhance organisational competitive advantage. This thinking is widely supported and discussed earlier in the dissertation.

BenMoussa (2009: 1491) states very aptly that the scope of and the sheer volume of KM material, conferences and seminars are evidence that KM is no longer just a buzzword or passing fad but a -"… discipline that needs to be considered in any modern strategy and planning.". This perspective is carved in reality by Onyancha and Ocholla (2009) with an article that analyses KM from a perspective of generally co-occurring terms in KM, contributing a list of terms that commonly recur with the term KM. These are - "… information resources management, which recorded a frequency count of 555, followed by information science (417), information technology (385), information services (200), information retrieval (170), library science (131), management information systems (124), libraries (113), management (111) and information resources (100)" just to name the top ten. (Onyancha & Ocholla, 2009: 5)

Onyancha and Ocholla (2009: 5) also classified several terms and categories describing KM -

> "… information resources management; management; industrial management; records management; information services management; database management; personnel management; document management; resource management; and library administration. The list of terms also comprises activities or processes associated with KM as perceived by LIS [Library Information Systems] professionals, e.g. information retrieval, organisational learning, data mining, electronic data processing, database searching, knowledge acquisition (expert systems), information organisation, documentation, knowledge representation (information theory), libraries – automation, information sharing, library cooperation, classification, and Website development.".

Their analysis points to a predicament that does not assist with the construction of a universally accepted definition and conceptual framework for KM because of the clear confusion with an attachment to IM, IT and related constructs. What remains contentious still is the differentiation between KM and IM, primarily due to the preoccupation of KM initiatives with the management of explicit forms of knowledge which have been done by IM initiatives all along (Bouthillier and Shearer, 2002). Because knowledge is understood to be more than information then KM should encompass more than just IM. This 'more' is evident in the definition of IC as

discussed earlier. It is typically linked to the intangible dimensions of knowledge and its ability to unlock advantage when managed innovatively.

It is thus understandable that there is a myriad of attempts to define KM, providing several KM definitions without authoritative and universal acceptance or conceptual clarity.[33] The divergent KM conceptualisations are compounded by the lack of consensus on the definition of knowledge as stated previously.

2.4.2 Knowledge Management by Definition

From the discussion above and the indications of chaos and confusion; defining KM is difficult; is organisation and/or discipline-specific because knowledge is prone to be context specific. A large number of KM definitions elucidated on in the published academic literature provide arguments for the inclusion of business/management processes, IT, IM, knowledge repositories and individual behavioural aspects. These technological and behavioural constructs enable organisations too - "… methodically acquire, store, access, maintain and re-use knowledge" from divergent sources (Eschenfelder, Heckman & Sawyer, 1998 in Kakabadse, *et al*., 2003: 79).

This management quandary invites some analysis of definitions, concepts and processes in existence and attributed to KM. The following table provides an overview of KM definitions (by no means exhaustive) -

Table 2.5: List of KM Definitions and Analysis

'ba'	Concepts	Activities/ Processes	Focus	Type of Knowledge	Motive
"…the ability to acquire, create, organize, share, and transfer knowledge.". (Wiig (1993) in Zhang, 2013: 18)					
Not stated	Ability	Acquire, Create, Organise, Share and Transfer	Process	Not stated	Not stated
"…the systematic, explicit and deliberate building, renewal and application of knowledge to maximise an enterprise's knowledge-related effectiveness and returns from its knowledge assets.". Wiig (1999a) in Onyancha & Ocholla (2009: 2)					
Enterprise	Systematic, Explicit, Deliberate	Building, Renewal and Application	Quality, Process and Objectives	Not stated	To enhance effectiveness and returns
"…involves the introduction of an organizational learning process through four management practices: *• identifying the end result of organizational knowledge (planning)* *• establishing structures that facilitate learning (organization)* *• establishing frameworks for eliciting and developing knowledge (management/ coordination)* *• developing a feedback mechanism (control)."*. Gorey & Dobat (1996: 1-4) in Godhout (1998: 12)					
Organisation	Learning	Planning, Organising, Controlling, Coordinating, Identifying, Eliciting, Developing and Feedback	Architecture	Not stated	Not stated

[33] Uit Beijerse, 1999; Kakabadse, *et al*., 2003; Grossman, 2007; Sutton, 2007; Onyancha and Ocholla, 2006 and 2009; Popa, 2010.

'ba'	Concepts	Activities/ Processes	Focus	Type of Knowledge	Motive
"…formalization of, and access to, experience, knowledge and expertise that create new capabilities, enable superior performance, encourage innovation and enhance customer value.". Beckman (1997: 1-6)					
Not stated	Enabling, Encouraging, Enhancing, Innovation	Formalisation, Access	Process, Types of knowledge and Quality	Experience, Knowledge and Expertise	To enhance performance, development, innovation and value.
"…the systematic underpinning, observation, instrumentation, and optimization of a firm's KM knowledge economies [i.e. construction, dissemination, embodiment, and use].". Demarest (1997) in Holsapple & Joshi (1999: 5)					
Firm	Systematic	Construction, Dissemination, Embodiment, Use	Process	Not stated	Not stated
"…collection of processes that govern the creation, dissemination and utilization of knowledge to fulfil organizational objectives.". Murray & Myers (1997: 29)					
Organisation		Creation, Dissemination, Utilisation (including a 'collection of processes' that govern these). This provides a distinction between core and other processes.	Process	Not stated	Objective achievement
"…involves establishing a set of operational processes intended to subject knowledge resources to a management cycle that includes planning, organizing, decision making, controlling and coordinating.". Godhout (1998: 12)					
Not stated	Management cycle	Planning, Organising, Decision-making, Controlling, Coordinating	Process	Resources	Not stated
"…achieving organizational goals through the strategy-driven motivation and facilitation of (knowledge-) workers to develop, enhance and use their capability to interpret data and information (by using available sources of information, experience, skills, culture, character, personality, feelings, etc.) through a process of giving meaning to these data and information.". Uit Beijerse (1999: 102)					
Knowledge workers	Strategy-driven	Develop, Enhance, Use, interpret and Giving meaning	Process, Types of knowledge and information	Experience and Skill	Goal achievement
"…the deliberate design of processes, tools, structures, etc. with the intent to increase, renew, share, or improve the use of knowledge represented in any of the three elements of intellectual capital.". Seemann, *et al*. (2000: 5)					
Organisation	Deliberate	renew, share, or improve the use of knowledge	Architecture and Type of knowledge	IC	Enhanced performance in knowledge processes
"…describes management's efforts to ensure that these assets are continually in motion, being enhanced, shared, sold, or used, and that they generate superior business results.". Seemann, *et al*. (2000: 5)					
Business	Management effort and Continuous motion	Increase, Renew, Share, Improve, Use Enhanced, Sold	Process	Assets	Enhanced performance in knowledge processes and superior

'ba'	Concepts	Activities/ Processes	Focus	Type of Knowledge	Motive
					business results
"… to make the right knowledge available to the right people at the right time.". Kidwell, Vander & Johnson (2000) in Manuri & Yaacob (2011: 77)					
People	None	Availability	Process and Quality	Not stated	Not stated
"…conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that strive to improve organizational performance.". O'Dell & Jackson (1998: 4)					
People and organisation	Conscious strategy	Sharing, Action	Process and Quality	Not stated	Improved organisational performance
"…a field concerned with the exploitation and development of the knowledge assets of an organization with a view to furthering the organization's objectives.". Rowley (2000: 9) in Onyancha & Ocholla (2009: 2)					
Organisation	Field	Exploitation, Development	Assets	Not stated	Furthering organisational objectives
"… a discipline that promotes an integrated approach to identifying, managing and sharing all of an organization's knowledge assets including unarticulated expertise and experience resident in individual workers … it involves the identification and analysis of available and required knowledge, and the subsequent planning and control of actions to develop knowledge assets so as to fulfil organizational objectives.". Kim (2000: 3) in Onyancha & Ocholla (2009: 2)					
Individuals, Organisation	Discipline and Integration	Identifying, Managing, Sharing, Analysis, Planning, Control, Development	Process	Assets, unarticulated expertise,	Fulfil organisational objectives
"…embodies organizational processes that seek a synergistic combination of data and information processing capacity within information technologies, and the creative and innovative capacity of human beings.". Malhotra (2001) and [Malhotra (1998)] in Zhang (2013: 18)					
People and Organisation	Synergistic	Combination,	Process and IT	Not stated	Not stated
"…the overall task of managing the processes of knowledge creation, storage and sharing, as well as the related activities.". Kucza (2001: 16)					
Not stated	None	Creation, storage sharing, related activities	Process	Not stated	Not stated
"…the processes and procedures that govern the creation, dissemination and utilization of knowledge by merging organizational structures and people with technology.". Bhatt (2001) in Zhang (2013: 18)					
People, Organisation	Merging organisational structures	Creation, Dissemination, Utilization, Merging	Process and Organisational Architecture	Not stated	Not stated
"an interdisciplinary field that is concerned with systematic, effective management and utilization of an organization's knowledge resources ... it encompasses creation, storage, retrieval, and distribution of an organization's knowledge – similar to records and information management.". Read-Smith, Ginn, & Kallaus, *et al.* (2002: 317) in Onyancha & Ocholla (2006: 3)					
Organisation	Inter-disciplinary field, Systematic and effective, Similar to	Creation, Storage, Retrieval, Distribution, utilisation	Process and records and IM focus	Not stated	Not stated

'ba'	Concepts	Activities/ Processes	Focus	Type of Knowledge	Motive
	records- and IM				
"…the organisational capability which identifies, locates, creates or acquires, transfers, converts and distributes knowledge for competitive advantage.". Walters (2002) in Shajera & Ahmed (2015: 89)					
Organisation	Capability	Identifies, Locates, Creates or Acquires, Transfers, Converts and Distributes	Process	Note state	Competitive advantage
"… the combination of cultural and technological processes of an organisation.". Barth (2002) in Manuri & Yaacob (2011: 77)					
Organisation	Combination	Cultural processes, Technological processes	Aspects of organisational architecture	Not stated	Not stated
"… military KM as 'a strategic approach to achieving defense [sic] *objectives by leveraging the value of collective knowledge through the processes of creating, gathering, organising, sharing and transferring knowledge into action.".* McIntyre, Gauvin & Waruszynski (2003) in Manuri & Yaacob (2011: 77)					
Military organisations	Strategic approach of leveraging collective knowledge value through processes into action	Creating, gathering, Organising, Sharing Transferring	Process	Not stated	Achieving defence objectives
"An environment that facilitates knowledge discovery, creation and innovation, and which fosters the development of a learning organization.". Girard (2004, online)					
Organisation	Learning	Discovery, Creation, Innovation	Process and Learning Organisation	Not stated	Development
"…as a socio-technical phenomenon where the basic social constructs such as person, team and organization require support from ICT applications.". Lytras & Pouloudi (2006: 64)					
Person, Team and Organisation	Socio-technical phenomenon	Not stated	ICT	Not stated	Not stated
"…addresses the generation, representation, storage, transfer, transformation and application of organizational knowledge.". Hedlund (2007) in Zhang (2013: 18)					
Organisational	None	Generation, Representation, Storage, Transfer, Transformation, Application	Process	Not stated	Not stated
"…an organisation's systematic endeavours to achieve organisational goals (such as the contribution to public welfare, profit maximisation, cost reduction or the satisfaction of customer needs) by optimising the use of knowledge.". Riempp & Smolnik (2007: 4)					
Organisation	Systematic endeavours	Use	Performance and service delivery	Not stated	To achieve organisational goals (such as the contribution to public welfare, profit maximisation, cost reduction

'ba'	Concepts	Activities/ Processes	Focus	Type of Knowledge	Motive
					or the satisfaction of customer needs) by optimising the use of knowledge
"…a discipline that promotes an integrated approach to identifying, retrieving, evaluating, and sharing an enterprise's tacit and explicit knowledge assets to meet mission objectives.". AKM (2008) in Manuri & Yaacob (2011: 77)					
Enterprise	Discipline and Integration	Identifying, Retrieving, Evaluating, Sharing	Process	Tacit and Explicit knowledge assets	Meet mission objectives
"…a strategy that assists organisations to use knowledge to envisage, make and control the whole decision-making process.". Kongpichayanond (2009) in Tubigi, *et al*. (2013: 2)					
Organisation	Strategy	Use	Strategy and decision-making process	Not stated	Envisage, make and control the entire decision-making process
"…the process through which organizations generate value from their intellectual and knowledge-based assets.". Popa (2010: 57)					
Organisation	None	None stated	Process	Intellectual and knowledge assets	Process, Value, Intellectual assets, Knowledge-based assets
"…the discipline of enabling individuals, teams and entire organisations to collectively and systematically capture, store, create, share and apply knowledge, to better achieve their objectives.". Young (2008) in Manuri & Yaacob (2011: 77)					
Individuals, Teams Entire organisations	Enabling, discipline, collectively and systematicall y,	Capture, Store, Create, Share and Apply	Process	Not stated	Better achieve objectives
"…that process established to capture and use knowledge in an organisation for the purpose of improving organisation performance.". Lungu (2011: 117)					
Organisation	None	Capture, Use	Process	Not stated	Improved performance
"… a process that through creating, accumulating, organising and utilising knowledge helps achieve objectives and enhance organisational performance. KM also consists of strategy, cultural values and workflow.". Rašula, Vukšić & Štemberger (2012: 147)					
Organisation	Strategy, cultural values and workflow	creating, accumulating, organising and utilising	Process	Not stated	Achieve objectives and Enhance performance
"… a process that transforms individual knowledge into organisational knowledge.". Rašula, Vukšić & Štemberger (2012: 147)					

'ba'	Concepts	Activities/ Processes	Focus	Type of Knowledge	Motive
Individual and Organisation	None	transforms	Process	Not stated	Not stated
"…the key objective of management is to improve the processes of acquisition, integration and usage of knowledge, which is exactly what knowledge management (KM) is about.". Rašula, Vukšić & Štemberger (2012: 147)					
Not stated	Integration	Acquisition, Integration Use, Creating, accumulating, organising, utilising, Usage	Process	Not stated	Process improvement
"…We manage Knowledge Processes. There are many K processes which can be aggregated into three: 1) Acquire (from external sources), 2) Produce or Create new K, and 3) Integrate or put to use.". KMI™					
Not stated	Integrate	Acquire, Produce/Create, Integrate/use	Process	Not stated	Not stated
"KM = $(P + K)^S$". P is for people, the addition sign is for technology and K is knowledge. S is for sharing.". Zhang (2013: 18)					
People	Combination and multiplication through technology	Sharing	Process and Technology	Not stated	Not stated

Shajera and Ahmed (2015: 89) state that - "A consistent theme in all supported definitions of KM is that it consists of processes or a set of actions for creating and using knowledge to achieve or enhance different outcomes, such as organisational performance, organisational goals, competitive advantage, or overall success.". This is a practical approach to defining KM.

There is overwhelming support for KM to be located (or 'ba') in and for organisations (including derivatives such as firms, business and enterprises). It can be assumed that 'organisation' includes every element of such entity (people, physical spaces, technology, etc). Bhatt (2001) in Zhang (2013: 18) specifically stated "… by merging organizational structures and people with technology" knowledge can be managed. This provides recognition for the existence of knowledge in organisations, people and technology. Merging possibly alludes to the requirement for integration. In fact, there are several authors from the list above that includes 'integration' as a concept in their definitions. This is important for KM due to the dynamic nature of knowledge; without integration of various knowledge sources the evolution of knowledge will be slower and one dimensional. Other authors include 'systematic' as a concept for KM. Systematic KM possibly refers to the processes followed. However, note must be taken that knowledge creation or development might follow an un-systematic path due to the innovative nature of people and the ubiquitous nature of knowledge and virtually unlimited access. Thus, knowledge development might be in leaps-and-bounds rather than step by step. Once created though, the continued management thereof should be integrated and systematic.

Some authors specifically state that KM is important to and practised by people (individuals, knowledge workers), teams and the organisation. This provides acknowledgement of the levels of KM activities in organisations and also that both tacit and explicit knowledge needs management.

No specific spaces where mentioned such as data-, information-, and/or knowledge bases or warehouses. ". Read-Smith, Ginn, & Kallaus, *et al*. (2002: 317) in Onyancha & Ocholla (2006: 3) mention of "records and information management" came the closest to the warehousing concept.

Most of the definitions state that knowledge must be managed, but does not elaborate on what that knowledge possibly consist of. This is quite possibly the result of the divergence in definitions for knowledge as a construct. The definitions listed above are very cryptic in their mention of types of knowledge. Some authors classified knowledge as explicit and tacit (or at least inferences to these as inherent in organisations and people). A number of authors classified knowledge as skills, experience and expertise, which is closely associated with tacit knowledge. One author included IC as the knowledge to be managed, which from the discussion above, includes both tacit and explicit knowledge. The researcher supports IC as a construct to describe organisational knowledge because of the inclusivity of the construct. Other authors classify knowledge as assets. This has a practical implication for organisations when considering asset management. Assets are also closely linked to advantage and will thus attract specific management attention.

Rašula, Vukšić and Štemberger (2012: 147) and the KMI definitions are very similar, concise, practical, as well as easy to use and remember. These constitute the basis for all knowledge-intensive activities (KMI, module 8, slide 3). Notwithstanding the practical nature of these definitions, they offer little more than a short summary of KM processes distilled from layers of semantics. Limited expression is given in variations of combinations in these definitions about 'who, what (types of knowledge), where ('ba'), when, how (process and/or approach), which effects (performance, objectives, goals, service delivery, etc) and what thereafter (survival, advantage, etc)'. The definitions mostly express on 'how' or approach/process. The researcher is not in favour of a process-based KM definition. A definition for the SA DOD should encompass more than just 'how', possibly expressing on what type of knowledge should be managed, how, why and to what effect.

The KM definitions mostly focus on what is perceived as KM processes. Authors specifically state the processes regarded as defining to the type of management. There is a tendency to define KM for the sake of expressing on a number of processes with no clear or no expression on why KM is necessary. This is defining for the sake of defining a phenomenon resulting in management activities and processes for the sake of having them.

Most of these processes are also endemic to data management and IM. Specifically stating the processes in the KM definition could possibly limit the evolution and potential of the KM 'discipline'. The researcher supports a process approach to KM, however, this process should be calibrated with concepts such as integration and the processes should not be listed in the definition of KM.

Other focus provided by the definitions are regarding quality (meeting objectives, enhanced results or returns, superior performance, etc). The stated processes are thus positioned to assist in achieving these goals. The goals stated in some of the listed definitions position KM to provide improved performance from a process perspective or from an organisational performance perspective. This performance is linked to other statements to e.g. enhanced returns and value, service delivery, innovation, objective achievement, and enhanced decision-making process. At least one author stated competitive advantage as the goal of KM.

Knowledge management as a construct and field of study approach tangibility, usefulness and practicality when considering the KM enabling processes listed discussed above in brief and later in this Chapter of the dissertation combined with KM being directed towards managing IC (as a practical solution to identify knowledge in organisations). "The goal of knowledge management is a practical one …" (Probst, 1998: 17); "… (KM) involves all practices of an organization to create, store, use and share knowledge" (Probst, Büchel, & Raub, 1998) in Lindner and Wald (2010: 888). It is important to simplify the philosophical debate surrounding the KM body of knowledge – driving the quest towards the construction of practical solutions to organisational challenges. The KMI voice this in their training material, proposing that KM is about knowledge processes (acquire, create and integrate) and the management of these processes. However, just using processes to define KM will possibly result in organisations not understanding why they are doing KM. Thus, the researcher is of the opinion that a KM definition should provide more comprehensive definition comprising more management facets to guide the organisation towards success or advantage. Such a definition is proposed by the researcher in chapter 3 of the dissertation.

This said, there is also no universally accepted implementation programme for KM (Litvaj & Stancekova (2015: 834). The KMI programmes have come a long way towards filling this gap. Although the definitions and implementation approach differ among businesses and organisations; there seems to be an agreement to some extent at a process level. Let us consider the 'why' of KM from an organisational perspective.

Questions could also be raised regarding the necessity for KM in an already congested management space where constructs such as strategic management and operational project management are well recognised. Let us briefly consider some convergence and divergence between these constructs.

2.4.3 Strategic Management, Project Management and Information Management

> *"What is of supreme importance in war is to attack the enemy's strategy (Sun Tzu 1971)"*
> *(Snyman & Kryger, 2004: 8)*

Conceptually, strategy as a construct has been evolving over many centuries. Strategy has remained a very important enabler to organisational success in business and/or on the battlefield. The expression of strategy in terms of competitive forces, or from a resource-based perspective, or in terms of organisational complexity all basically leads to the same conclusion - strategy is about positive or negative choice. Choice is invariably expressed in the form of strategic intent that expresses the organisation's position regarding competitiveness. Competitiveness is based on the economics involved in being a market leader or market follower. The adaptiveness of the organisation also plays a key role in any organisations endeavour to compete. Being the master of the organisation's knowledge is paramount to both setting and executing strategy. Strategic management is the vehicle for strategy execution.

> *"… knowledge drives strategy and strategy drives knowledge management" (Tiwana, 2000: 103)*

David (2009) defines strategic management as - "The art and science of formulating, implementing, and evaluating cross-functional decisions that enable an organization to achieve its objectives." (David, 2009: 36-37, 40, 48) This definition seems to be quite authoritative and widely used (Nábrádi, date unknown, slide 9, Kretovics, 2011; Hamilton & Kwon, 2016 and many others). Both art and science have strong connotations to knowledge. This does not mean that strategic management equates to KM.

French (2009) in Jofre (2011: 49) defines strategic management as - "…A process that deals with the entrepreneurial work of the organisation, with organisational renewal and growth, and more particularly, with developing and utilising strategy, which is a guide to the organisation's operations." Again, the links with knowledge and knowledge development are visible in "entrepreneurial work … organisational renewal and growth". However, strategic management is suggested as an enabler to growth and operations. Jofre (2011: 49) states that since the beginning of the 21st century - "… strategy management has broadly focused on the advent of a — new economy, supported by the increasing role of knowledge and communications (technology) in businesses, and therefore it has focused on issues such as innovation and technology change".

The term strategic management and strategic planning are used interchangeably. However, David (2009) points out that strategic management refers to strategy formulation, implementation, and evaluation – exploiting and creating new opportunities for the future. Strategic planning is more related to strategy formulation – setting the organisational game plan – optimising for the future the current trends. Strategic management wants the organisation to continually scan the internal organisational- and external environment for both positive and negative change. Successful strategy aims at creating a fit between the organisation's business platform and the external environment within which the organisation operates as well as with the organisation's internal environment i.e. it's business processes as regulated by the drive towards attaining the organisational vision. (Grant, 2005: 14)

Such change will present opportunity or threat which in turn will require new knowledge, decisions and actions. Without a dedicated KM capability (KMC), organisations will attempt strategic management based on the results or products of data- and information management. This is less than ideal for competitiveness in the knowledge era. The requirement for knowledge is fairly evident in the brief discussion above as an enabler to cope with the competitive challenges ahead. The management of knowledge is posited by this dissertation as the vehicle to provide knowledge that will enable strategising, strategic management and competitiveness.

Strategy, therefore, aims at aligning the answers to the strategic management questions of who, why, what, where, when and how and what thereafter (or the organisational objectives, resources and methods) with and within the internal and external environment in an endeavour to create balance, integration, synergy, complementarities and leverage – i.e. strategic fit. The importance of strategic fit amongst all the components of the business environment is in the relationships that are created by creative planning and innovative thought. The ultimate goal of creating a strategic fit and ultimately of strategy as a concept is to create competitive advantage. Knowledge and the management thereof is a critical resource and process that enables the quest for a strategic fit.

Strategy also enables the corporate and functional levels of organisations to ensure that resource management is aligned with the objectives of organisations. Thus, the strategic intent on organisational knowledge should be found in corporate strategy. This should result in an organisational mandate to establish a KMC and to execute KM. The KMC will craft a lower level (functional strategy) to direct KM related operations. At both levels of the organisation (corporate and functional) strategic management processes are employed to ensure that the 'art and science of formulating, implementing, and evaluating cross-functional decisions that enable an organization to achieve its objectives' takes place. Another enabler at the disposal of organisational is project management.

Knowledge management theory and practice have made its debut in project management literature only recently. (Horstein, 2014 and De Nadae & Monteiro de Carvalho, 2017) Project management literature exploring KM mostly – "highlight the key role of the project management office (PMO) for storing and disseminating knowledge (Aubry & Hobbs, 2011; Müller, Glückler, Aubry & Shao, 2013 and Pemsel & Wiewiora, 2013 in De Nadae & Monteiro de Carvalho, 2017: 351). De Nadae & Monteiro de Carvalho (2017: 351) list a number of studies since 2007 that explored KM in project management. These are –

- Bower and Walker (2007) - planning knowledge management and their phases in projects.
- Ajmal and Koskinen (2008) - analysing knowledge transfer in the projects and the influence of organizational culture.
- Reich, Gemino and Sauer (2008) - knowledge management in IT projects.
- Gladden (2009) and Alkhuraiji, Liu, Oderanti and Megicks (2016) - how to manage and apply knowledge in organizations.
- Petter and Randolph (2009) - the processes of reusing knowledge among projects.
- Tukel, Kremic, Rom and Miller (2010) - knowledge and practice's salvages.
- Johansson, Hicks, Larsson and Bertoni (2011) - the importance of knowledge maturity to development projects.
- Aubry, *et al.* (2011) - the relationship between organisational performance and the knowledge of the project being managed.
- Alin, Taylor and Smeds (2011) - knowledge transformation in projects.
- Gasik (2011) - show a model of project knowledge management.
- Koskinen (2012) - knowledge management as a factor that can improve project implementation.
- Müller, *et al*. (2013) - project management knowledge in project management offices.
- Horstein (2014) - knowledge as a factor of integration of projects.

Cicmil & Hodgson (2006: 113) state that since the 1990s literature emphasized -

> "… the centrality of project-based organizing and project working in the processes of information sharing and knowledge management in organizations (Davenport & Prusak, 1998; De Fillipi, 2001; Hansen, Nohria, & Tierney, 1999; Silver, 2000; Wiig, 1997). … Projects supposedly provide, according to Cleland [1997], a central point where new knowledge, skills, and attitudes can be developed. …Not only are projects considered suitable ways to control endeavours in a turbulent environment (Ekstedt, Lundin, Soderholm, & Wirdenius, 1999) but

> also, more importantly, they are regarded as the appropriate way to stimulate a learning environment and enhance creativity so as to deliver complex products (Hobday, 2000)."

This acknowledges the importance of knowledge in and to project management and that new knowledge emerges from project management. This, however, does not equate KM to project management. So what is a project and project management? A project is defined as "… a complex, non-routine, one-time effort limited by time, budget, resources and performance specifications [uniqueness and non-routine] designed to meet customer needs". (Gray & Larson, 2008 in Na, 2015: 45; also in Cope, Cope & Hotard, 2006). This seems to be an authoritative definition amongst academics and practitioners. The PMBOK® Guide (2013: 5) defines project management as "… the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (also in Burke, 2013, Bodicha, 2015 and others). In plain language; project management enables organisations to execute designated projects effectively and efficiently (Bodicha, 2015).

Projects are unique initiatives aiming at delivering specific products and/or services (or tangible results). Projects might also be undertaken to deliver a specific result (this might be more intangible). Projects are characterised by the fact that they have a distinct start and end time, thus making scheduling very important. Projects are thus temporary management initiatives. "Although repetitive elements may be present in some project deliverables and activities, this repetition does not change the fundamental, unique characteristics of the project work." (PMBOK® Guide, 2013: 3)

This is summarised as follows – "… the four major characteristics of projects: the uniqueness and temporariness; discontinuous working and teams; lack of a natural mechanism of learning; and short-term orientation". (Linder & Wald, 2010: 888) in Na (2015: 45) It is these characteristics that are obstacles to KM within projects. Lindner and Wald (2011: 877) citing several authors in their statement –

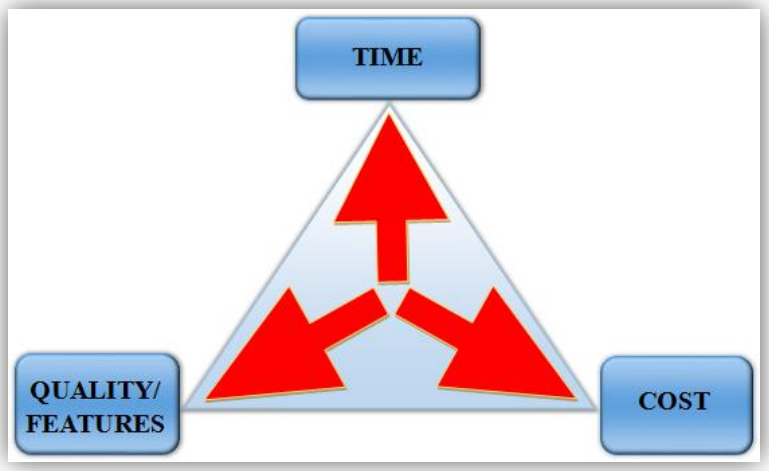
> "Due to their uniqueness and short-term orientation temporary organizations face particular obstacles in their KM. After a project is finished the constellation of people working together is resolved, fragmenting the project knowledge. In contrast to permanent organizations where departments and divisions act as knowledge silos, in temporary organizations routines and organizational memory hardly emerge. There is a lack of mechanisms for knowledge capturing, storing and disseminating and for organizational learning".

Projects follow a life cycle that is divided into four sequential phases: definition, planning, implementation and delivery phases – illustrating the limitation in lifespan and that there are predictable changes in the level of effort and focus over the life of the project. These fluctuations have an impact on KM for the project and for the organisation. Bocij, Chaffey, Greasley and Hicke (2006) summarise the three key project management elements

For projects to be successful (create value) they have to be selected, prioritised and aligned with the organisation's business strategy. Project management can be found in the "how to compete" strategy domain. Project management creates capabilities (facilities, technology, and machinery) within a set period of time and within budget constraints to support the execution of the business strategy.

Figure 2.8: Project Management Key Elements by Bocij, Chaffey, Greasley and Hicke (2006)

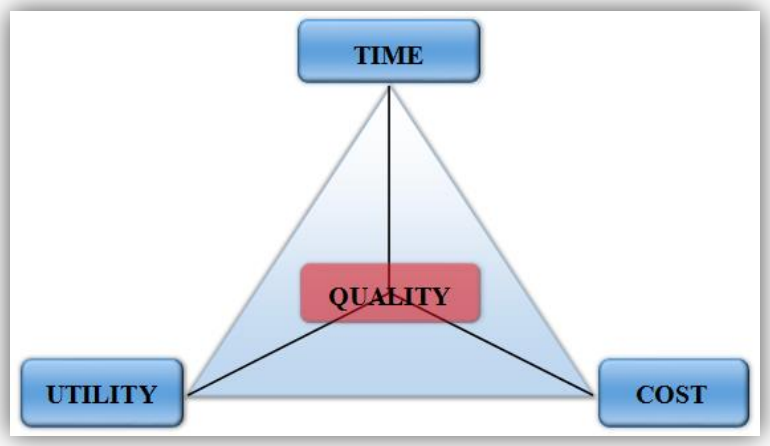
Source: Adapted from Bocij, *et al*. (2006: 384). This triangle is generally accepted project management practice - Cope, Cope & Hotard (2006) and Bodicha, (2015).



Project management can thus also be employed to create products/services/effects for the organisational KMC. Rwelamila (2007: Slide 16)[34] proposes the following graphic to depict the relationship of inputs and output of a project:

Figure 2.9: Project Management Key Elements by Rwelamila (2007)

Source: Adapted from Rwelamila (2007: Slide 16).



If these elements are managed effectively (excellently) the project will be delivered on time, within budget and at the correct level of quality relating to the requirements of the customer (utility) and constrained by the schedule and budget. Note that the sides of the diagram are even. This translates into equal management effort in all directions. If one element of the triangle is neglected the other elements will be negatively affected. Graham and Englund (2004) state that with accurate and comprehensive planning time and cost can be reduced with a commensurate increase in quality. The 'cost' factor in projects can be expanded to include all required project resources. This would include the availability of knowledge to the project. The organisational KMC should make such knowledge available to the project team. Commensurately, the project team should make all knowledge developed during the project life cycle available to the organisational KMC to ensure future availability. Where this is not managed in an integrated manner, organisations lose their knowledge once projects are closed for various reasons.

These elements can also be linked to strategy from the perspective that time can be linked to first-to-market principles (market leaders), the cost can be linked to affordability (economies of scale and cost leadership) and quality and features can be linked to niche products (a product differentiation strategy). All of these elements, in turn, are linked to knowledge; if knowledge is

[34] Prof P.D. Rwelamila, PhD, PrCPM; used this graphic in a lecture to the Masters in Businees Leadership Project Management class during the study school in 2007.

considered to be the asset that unlocks competitive advantage. Milosevic, & Srivannaboon (2006: 9) states that project management is a "…specialized form of management, similar to other functional strategies, that is used to accomplish a series of business goals, strategies, and work tasks within a well-defined schedule and budget". The relationship can thus be construed to be symbiotic.

Projects are needs based. Projects are terminated when the need for the product/service/result lapse or the project goal was achieved. The temporary nature of projects does not impact on the longevity of the project. Projects may extend over several years or only over a number of days. Projects are also not limited to a specific level within organisations. "Projects are undertaken at all organizational levels. A project can involve a single individual or multiple individuals, a single organizational unit, or multiple organizational units from multiple organizations." (PMBOK® Guide, 2013: 3) Projects and their management are thus quite universal. Operations management, on the other hand, is -

> "… a subject area that is outside the scope of formal project management … an area of management concerned with ongoing production of goods and/or services. It involves ensuring that business operations continue efficiently by using the optimum resources needed and meeting customer demands. It is concerned with managing processes that transform inputs (e.g., materials, components, energy, and labor) into outputs (e.g., products, goods, and/or services)." (PMBOK® Guide, 2013: 13)

The similarity between operations management and project management is simply one of process. Both use distinct processes to deliver products/services/results. However, projects are temporary in nature and operations are permanent. Milosevic, & Srivannaboon (2006: 9) bring the theory closer to practice –

> "The essence of project management is to support the execution of an organization's competitive strategy to deliver a desired outcome (i.e., fast time-to-market, high quality, low-cost products) (Milosevic, 2003). As opposed to the traditional stereotype, the recent literature recognizes project management as a key business process (Jamieson & Morris, 2004). This view defines an organization as the process rather than the traditional functional or matrix form and describes project management as one of the key business processes that enable companies to implement value delivery systems. Therefore, when organizations link their projects to their business strategy, they are better able to accomplish their organizational goals."

Crawford (2006: 82) states that - "Organizational learning comprises both knowledge management and lessons learned. It is also associated with project management community." Crawfort (2006) states further that project management benefits to the organisation include - "… greater entrepreneurship, more client satisfaction, more effective communication, more knowledge management and know-how transfer, improved project control, better multiprojec coordination, greater project transparency, and better project performance." (Crawford, 2006:82) Na (2015) capture all these elements by stating that KM is beneficial to successful project execution. Cope, Cope & Hotard (2006) add other benefits of KM to project management; such as risk management and learning curve acceleration. De Nadae & Monteiro de Carvalho (2017) add knowledge creation using the SECI knowledge transformation model (discussed in more detail later in the chapter) and overcoming the knowledge related mechanisms of organisations and projects to the list. That said,

organisational culture impacting knowledge sharing was one of the greatest influencers of the interaction between project management and KM according to De Nadae & Monteiro de Carvalho (2017).

Thus, the link between project management and KM can be expressed in terms of the functional toolset project management offers to KM practitioners within which to implement KM initiatives. Project management is thus an enabler to successful KM. From a different perspective; project management has a role to play in organisational learning because of the nature of the processes. Thus project management is also a KM process enabler from a knowledge sharing and using perspective. Strategic management facilitates the balancing of the organisation's resources, methods and goals by strategizing at various levels within the organisation on how, where, when, why, who, what thereafter and with what effect to use organisational capabilities such a KM and organisational methods and expertise such as project management.

Much information is also managed by organisations, in general, and within projects. It is thus apt to consider briefly what is the difference between KM and IM – with due regard for definitions of knowledge and information discussed earlier in this chapter. Mosha (2017: 8) summarises the differences between IM and KM as follows –

> "IM deals exclusively with explicit representations and guarantees access, security, delivery, and storage. In this case efficiency, timeliness, accuracy, completeness, speed, the cost of storage and recoveries are the main concerns. On the other side, KM values originality, innovation, agility, adaptability, intelligence and organisational learning. Therefore, KM focuses on people and is more concerned with critical thinking, innovation, relationships, exposition of ideas, standards, skills and encouraging learning and sharing of experiences."

Figure 2.10 provides some comparative differences between the two constructs -

	Information management	Knowledge management
Approach	Technology-driven	Human-centric
Aims	Data processing	Value proposition
Pursuit	Efficiency of existing process	Innovation and reengineering of existing process
What to share	Data and information in explicit forms	Tacit and explicit knowledge
Main activities	Storage and processing	Collaboration and sharing

Figure 2.10: At-a-Glance Differences between Information Management and Knowledge Management

Source: Na (2015: 20).

Although both the constructs have 'management' in common; the real differences are in 'what' is to be management. Information management focuses on explicitness and warehousing.

Knowledge management focuses on generating wealth or advantage with a combination of tacit and explicit knowledge that can be shared and processed in more ways than just through technology enablers. When considering that information is considered building blocks of knowledge then it would be reasonable to state that IM is an enabler to KM. Both IM and KM should be addressed in organisational strategy and should be managed strategically. Both IM and KM can be enabled with project management and through various projects. Both KM and projects can deliver knowledge assets. Only KM has as its *raison d'etre* the management of such assets in order to provide the organisation with the knowledge required to secure an advantage. Let us now consider the question 'why KM?', from an organisational perspective.

2.5 THE IMPORTANCE OF KNOWLEDGE MANAGEMENT TO ORGANISATIONS

> *"In 50 years' time, we will be designing products we don't know, incorporating materials which haven't been invented, made in processes yet to be defined, by people we have not yet recruited. Under these circumstances, all we can carry forward is our knowledge, and our knowledge of how to improve our knowledge.''* (Siemieniuch & Sinclair, 1997 in Ďurišová, 2011: 45).

In order to improve organisational knowledge to the point where it is the source of advantage is to manage the knowledge in an integrated manner with other assets and sources of organisational advantage. Why should the SA DOD be interested in KM? This question is raised by SRQ2 of the dissertation. The question is based on the assumption that knowledge and its management are important -

> "Whereas at one time the decisive factor of production was the land, and later capital — understood as a total complex of the instruments of production — today the decisive factor is increasingly man himself, that is, his knowledge, especially his scientific knowledge, his capacity for interrelated and compact organization, as well as his ability to perceive the needs of others and to satisfy them." (Pope John Paul II, 1991).

This fourth element of production, knowledge, was introduced as such in Chapter 1 of the dissertation. Internationally, governments and businesses alike are subscribing to the importance of knowledge as an asset to ensure sustainable development, innovation, service delivery and advantage in the knowledge era. From the World Development Report (1998) quoted by Malhotra (2003: 1) in La Grange (2006: 33) -

> "For countries in the vanguard of the world economy, the balance between knowledge and resources has shifted so far towards the former that knowledge has become perhaps the most important factor determining the standard of living – more than land, than tools, than labour. … It is generally understood that countries that are rich in knowledge assets and intellectual capital fare better in terms of higher levels of growth and development … knowledge assets represent the fount of a nation's competencies and capabilities that are deemed essential for economic growth, human development and quality of life.".

Interestingly, the quote above distinguishes between 'knowledge assets' and IC. This could fuel construct dissonance within organisations without detailed calibration. Nevertheless, Arora (2011: 165) echoes the quote above, stating that - "knowledge is increasingly recognized as an important, strategic resource by all types of organizations and institutions, whether private or

public, service oriented [*sic*] or production oriented [*sic*].". The importance of KM for public service organisations are supported by an extended list of authors[35], and *ipso facto*, for DODs of governments (La Grange, 2006).

Choo (1998: 2) in Bouthillier and Shearer (2002) states that knowledge is - "… the only meaningful economic resource". This expression not only supports the importance of knowledge for organisations but also support the symbiotic relationship between knowledge and meaning. Stated slightly differently – knowledge is full of meaning. Glaser (1998) in Ďurišová (2011: 45) is of the opinion that - "… [knowledge] is the only resource, whose value does not decrease, but increases with usage, a factor that ensures stable growth performance and competitive advantage". Hofer-Alfeis (2003) in Halawi, Aronson and McCarthy (2005: 75) states that there is an acceleration in the pace with which knowledge is used to secure an advantage. Importantly, these authors reiterate the linkage between knowledge or meaning and advantage. Coherent and integrated KM is positioned to achieve this.

Seemann, *et al*. (2000: 2) states that - "… market value [stems] from the knowledge assets, or [IC], that underlie a firm's performance". In contrast with the World Development Report (1998) quote above, the researcher supports the opinion of Seemann, *et al*. (2000: 2); that is, knowledge assets and IC are similar constructs. Years later, AL-Hakim & Hassan (2011: 948) stated (based on the opinion of several other authors) that -

> "In the knowledge-based economy era, superior organizations depend more on their knowledge-based resources to survive (Choi *et al*., 2008; Ho, 2008; Kim & Gong; 2009; Yang *et al*., 2009a) and to improve [organizational performance] (Haas & Hansn, 2005; Liao & Wu, 2009; Safa *et al*., 2006). Therefore, the [KM] implementation has become increasingly as a main power to improve [organizational performance] for various organizations (Haas & Hansn, 2005; Liao & Wu, 2009; Safa *et al*., 2006)".

Davenport and Prusak (2000: 13) state –

> "Knowledge, by contrast, can provide a sustainable advantage. Eventually, competitors can almost always match the quality and price of a market leader's current product or service. By the time that happens, though, the knowledge-rich, knowledge-managing company will have moved on to a new level of quality, creativity, or efficiency [evolving nature of knowledge]. The knowledge advantage is sustainable because it generates increasing returns and continuing advantages. Unlike material assets, which decrease as they are used, knowledge assets increase with use: Ideas breed new ideas, and shared knowledge stays with the giver while it enriches the receiver. The potential for new ideas arising from the stock of knowledge in any firm is practically limitless - particularly if the people in the firm are given opportunities to think, to learn, and to talk with one another.".

Onyancha and Ocholla (2006: 4) state from an organisational perspective that KM is important based on the importance attached to people's knowledge, skills and experience when properly managed. Schwab (2016: online) equates talent with knowledge and that talent will, progressively, in the future outpace capital as an important production factor. From an interpretivist

[35] Wiig, 2000; Motseniqos and Young, 2002; Halawi, Aronson and McCarthy, 2005; La Grange, 2006; Riege and Lindsay, 2006; Girard and McIntyre, 2010; Arora, 2011; Yadav and Singh, 2013.

perspective, these writers thus reiterate the importance of tacit knowledge and hints of specific management practices required to extract the best possible sustained levels of performance and advantage.

Considering Malhotra's (2003) opinion that knowledge assets have an infinite life expectancy, it would be very important to manage these assets in order to extract potential value when required. However, knowledge life expectancy is linked to advantage, not existence; with changes in the environment and innovation 'old' knowledge might become very relevant again. Knowledge does not cease to exist but continuously evolve into new meaning or knowledge.

Knowledge assets are - "… non-linear with respect to the effects they deliver" (Malhotra, 2003: 2). This opinion is based on the assumption that knowledge is continuously transferred or codified (explicit knowledge), exponentially, before people (tacit knowledge) die. Therefore, the inherent longevity of knowledge makes the asset valuable because it provides the continuous baseline for the creation of new knowledge based on the characteristic of knowledge explained as 'a dynamic human process'. Also not to be missed is the linkage between knowledge and effects. Of course, knowledge itself does not deliver 'effects' but the actions of people deliver effects. These effects might be more accurately delivered if it is based on knowledge rather than information or data. The accuracy improves when knowledge is understood to be evolving and managed as such.

At a more operational level, Du Plessis (2005) and Ndedla and Du Toit (2001) in BenMoussa (2009: 1491) - supported by views of Spender and Marr (2005), La Grange (2006) and Anand and Singh (2011), list a number of reasons why KM is important to organisations – some of these are:

- Creating and maintaining a competitive advantage – which is directly related to the survival and/or the profitability of an organisation. Some of these issues have been discussed above.
- Enhanced responsiveness and innovation[36], again linked to survival and advantage.
- Cost saving or increased financial performance (also Yadav & Singh, 2013).
- Enhanced employees' productivity (also Bouthillier & Shearer, 2002, Anand & Singh, 2011).
- Enhanced organisational productivity[37].
- Reducing negative effects associated with knowledge attrition (i.e. knowledge loss due to employees exiting the organisation) (also Anand & Singh, 2011).
- Enhanced decision-making, communication and collaboration, learning, skill levels, employee satisfaction, best practices, customer satisfaction, organisational continuity, loyalty, sales, revenue and/or profits, new product development, business opportunities, flexibility, quality, innovation and re-use of knowledge (Anand & Singh, 2011: 936 listing several authors).
- Reduced risk and cycle time (Anand & Singh, 2011: 936).
- Development of core competencies (Beijerse (1999) in Anand & Singh, 2011: 936).

[36] Also Holsapple and Joshi, 2000; Bouthillier and Shearer, 2002; Zieba and Zieba, 2014; Alrubaiee, Alzubi, Hanandeh and Ali, 2015.
[37] Also Chadha and Kapoor, 2010; Fugate, Stank and Mentzer., 2009; Ibrahim, Edgar and Reid, 2009; Zack, Mckeen and Singh, 2009; Kasim, 2008; Boumarafi and Jabnoun, 2008; several authors in Anand & Singh, 2011; Kharabsheh, Magableh and Sawadha, 2012 in Yadav and Singh (2013); several authors in Berraies, Chaher and Ben Yahia, 2014; Alrubaiee, Alzubi, Hanandeh and Ali, 2015.

Based on the strong business interest in KM (Holsapple & Joshi, 1999; Bouthillier & Shearer, 2002, Halawi, Aronson & McCarthy, 2005; Zieba & Zieba, 2014), mostly linked to realising competitive advantage (business niches and unique products and services) stemming from innovation (Zieba & Zieba, 2014) - most of the KM models and theory originate in the business environment for business. McNabb (2007) writes on public sector KM as a blueprint for innovation in government, concluding that KM is critical for public sector innovation. KPMG[38] research (1997) supports this opinion. BenMoussa (2009) illustrates this with statistics on how much was spent on KM software - $73 billion in 2007 and growing. From a public organisational perspective, Schwab (2016: online) states that -

> "Ultimately, the ability of government systems and public authorities to adapt will determine their survival. If they prove capable of embracing a world of disruptive change, subjecting their structures to the levels of transparency and efficiency that will enable them to maintain their competitive edge, they will endure. If they cannot evolve, they will face increasing trouble.".

The statement by Schwab above cannot be highlighted enough for modern militaries. Cost curbing corporate and military innovation is imperative to maintain, affordable, advantage. Knowledge and its management are an essential ingredient.

Public administration is the heart of the public service business model. Its primary output is products and services that are important for the survival and functioning of modern society and government. La Grange (2006) states that the focus in public administration has over years, shifted to being more citizen-centric, responsive and flexible. This requirement can be linked distinctively to the complexity brought about by globalisation and the ubiquitous availability of new meaning driving continuous evolution of most scientific and social paradigms. Knowledge management is positioned and employed by a business to provide and sustain competitive advantage under these market conditions. Knowledge management is positioned and employed by public service organisations to provide an advantage in support of affordable, quality, innovative and timely services and products. For public service, the motive is not profit but service and is important for societies to function. For this reason, KM has been at the receiving end of much attention for its potential application in public sector organisations (McAdam & Reid, 2000; La Grange, 2006).

This said, BenMoussa (2009: 1491), referring to several writers, claims that KM initiatives fail ("84% of KM projects") to be implemented and thus fail to deliver on the promise of competitive advantage. This might be so, but the failure rate due to implementation issues does not detract from the fact that knowledge exists and will provide an advantage if harnessed successfully. This makes KM a very important part of organisational strategy and processes if organisations strive to be world class in delivering products and/or services. Thus, in the researcher's opinion, KM implementation failure has nothing to do with the importance of KM but rather failures in e.g. organisational leadership, -culture and/or -strategic processes.

Most KM theories/models and software applications are directed at organisational survival in complex business environments and how to increase organisational competitive advantage and/or

[38] In 1997 research was done by KPMG (KPMG, 2000 in Bouthillier & Shearer, 2002) based on a sample of 200 large American businesses, revealing that at least 80% of the sample had knowledge management initiatives.

organisational performance. This conforms to a Knowledge-Based View[39] of the organisation (Spender & Marr, 2005 and Lindner & Wald, 2010) that posits the symbiotic relationship between knowledge, organisational survival and competitive advantage. A Knowledge-Base View is described as follows -

> "This base increasingly consists of knowledge based [*sic*] assets (Stewart, 1997; Roos, *et al*., 1997; Lev, 2001; Sveiby, 2001, 1997; Marr & Schiuma, 2001). The knowledge of a firm should be the central consideration on which to ground the organization's strategy and the primary basis on which a firm can establish its identity and frame its strategy, as well as one of the primary sources of the firm's profitability (Grant, 1991). Therefore, firms need to identify and develop their intellectual resources in order to establish and maintain a competitive advantage and to increase their performance (Petergraf, 1993; Prahalad and Hamel, 1990; Teece *et al.*, 1997). This has led to the development of the knowledge-based view of the firm that considers knowledge as the principal source of economic rent (Grant, 1991; Grant & Spender, 1996; Spender, 1994)." (Spender and Marr, 2005: 3).

This is possibly the most important realisation, now well published.[40] Competitive advantage is very similar to military advantage – striving to have the winning edge, to establish market leadership or to dominate the battlefield or having effective deterrence. What should be noted from the array of above-mentioned references is the time period the opinion is supported and the different number of aspects studied that supports this view. Henceforth, competitive advantage and military advantage will only be referred to as advantage.

Still considering why knowledge and KM are important. The Knowledge-Based View, briefly mentioned above, contrasts with the Resource-Based View of the organisation. The Resource-Based View positions internal organisational resources (e.g. niche resources and capabilities and differences in size or scale) as the primary source for advantage. Na (2015: 25) is of the opinion that –

> "While the resource based [*sic*] view proposes that an organisation's competitive advantage is derived from those valuable and unique resources that are costly for competitors to imitate, the knowledge based [*sic*] view focused on knowledge-related resources such as distinctive skills and routines as the most significant resource for establishing a dynamic capability or a competence. Thus, within this perspective emphasis is placed on internal processes and production arrangements. Researchers within knowledge-based view assume that the firm's ability to make the best use of dispersed and tacit knowledge relies on organisational capabilities, routines and firm-specific repository of resources."

An organisational Knowledge-Based View (as opposed to Resource-Based View theory) changes the organisational competitive focus from internal resources as the primary source of

[39] See Spender and Marr (2005: 3).

[40] Winter, 1987; Wiig, 1999; Drucker, 1991 and 1993; Kougot and Zander, 1992, Grant, 1996a; Liebowitz and Beckman, 1998; Godhout, 1998; Uit Beijerse, 1999; Bennett and Gabriel, 1999; Davenport, 1999; Holsapple and Joshi, 2000; Seemann, *et al*., 2000; Choi, 2000; Nonaka, *et al*., 2000; Bartczak, 2002; La Grange, 2006; Spender and Marr, 2005; Halawi, *et al*., 2005; Liang, Ouyang and Power, 2007; Hall, *et al*., 2007; Waddel and Steward, 2008; Werr, Blomberg, and Lowstedt, 2009; Zack, Mckeen and Singh, 2009 and Kamya, Ntayi and Ahiauzu, 2010; Manuri and Yaacob, 2011; Barquin, 2011, Yadav and Sing, 2013; Zhang, 2013; Tubigi, *et al*., 2013; Al Ghamd, 2013; Zieba and Zieba, 2014 and many more).

advantage to knowledge as the core of advantage. The theory developed for business provides valuable meaning for military KM based on the construct of advantage.

Riege and Lindsay (2006: 24) write from an Australian public sector perspective on matters pertaining to KM and stakeholder partnerships. Stakeholder relationships are considered a key source of IC (as discussed earlier – considered to be part of relational capital). They proceed to identify key governmental challenges to public policy delivery, dealing with community expectations and challenges highlighting the - "… importance of developing public policy via knowledge-based partnerships with its stakeholders". Militaries have numerous stakeholder relationships. The SA DOD has many knowledge stakeholders. Amongst these are the defence industry, aerospace sector, and the wider peace operations community – providing another reason why the SA DOD should consider comprehensive KM.

Other KM benefits are mentioned in Bouthillier and Shearer (2002) as improved decision-making and customer service. Schwab (2016: online) states - "Today's decision-makers, however, are too often trapped in traditional, linear thinking, or too absorbed by the multiple crises demanding their attention, to think strategically about the forces of disruption and innovation shaping our future.". To cope with this predicament there should be a concerted effort by organisations to base their decisions and actions on integrated knowledge as found in organisational IC. Knowledge management is proposed as a mitigating strategy and an enabler in the struggle against data/information overload[41] and paralysis. Based on the work of Taylor (2004); McKinnon (2005) and Moore (2005) - La Grange (2006) summarises a number of enablers and advantages that KM provides to public service -

- Increased accountability and access to information (through transparency brought about by the information age technology and legislation).
- National security (increased importance of intelligence operations (IntOps), typically after the 9/11 terrorist activities – spearheaded by the USA).
- Operational – and cost-efficiency; seamless service delivery as well as performance management and measurement (epitomised by e-government initiatives, balance scorecard approaches to management and strategy, total quality management and other adopted business best practice).
- Knowledge intensity of many government products and services (made possible by stakeholder collaboration resulting from public service complexity but also possibly as a requirement for governments to interact with stakeholders within the context of the knowledge economy/era).
- Security and privacy (found in new legislation).

Malhotra (2000) suggests that rapid advances and change in business environments, requiring flexible responses and organisational adaptability, are exposing inadequacies of the current processing power of IM systems/architecture to cope with KM requirements of new business organisations. Ramirez, Morales & Boliver-Ramos (2011) reference several authors that support a positive correlation between KM and the flexibility with which organisations can respond. This highlights the fact that IM is not KM and that IM is a KM enabler.

[41] Mortensen (2014: 9) acknowledges this problem within the context of USA military KM and the impact thereof on decision-making.

Decision-makers understand that the value of knowledge should be maximised; which is only possible when knowledge is managed (Uziene, 2010 in Ramirez, Morales & Boliver-Ramos, 2011). This begs the question; what value? Is it monetary value or time value or taxpayer/shareholder value? For militaries all these values are important. Military knowledge needs to stay relevant as long as possible because the acquisition thereof might be very expensive and the taxpayer needs to be assured that the required knowledge is acquired or created at the best possible price before it is needed or just-in-time. The military practitioner needs to know that the knowledge acquired or created is relevant for the longest possible time in operational and corporate management environments in support of the planned and expected effects and to provide a sustained advantage.

World class, advantage, survival, cost-benefit, effects or any other business/military related concept are based on or created by 'knowing' in advance or be the first to 'understand' the 'meaning' locked-in by context - thus being able to take decisions first that will result in first mover (action) advantage or the ability to dictate the shape of the new reality in your favour.

In military terms, this ability is called - '*being inside the opponent's OODA loop'*. It is directly related to survival and advantage. The 2008 Strategy for United States Air Force Intelligence, Surveillance and Reconnaissance (2008 USAF ISR Strategy) summarises a description of what they regard as knowledge and its relationship with advantage (albeit from a knowledge superiority argument perspective) as follows –

> "No military organization can survive for long in the face of enemy knowledge superiority. When the information age makes unprecedented quantities of data available to practically any group, knowledge superiority depends on qualitative differentials: identifying the specific target and directing the right matter to the right space at the right time within the opponent's observe-orient-decide-act (OODA) loop." (USA, 2008: 17).

The 2008 USAF ISR Strategy states the following about the relationship between meaning, understanding and intelligence –

> "How well disparate data can be synthesized to provide understanding which creates knowledge. The entire system, human and machine, needs the ability to combine seemingly unrelated data to create understanding. Superior training in the art of intelligence can greatly increase the ability to synthesize data and find meaning." (USA, 2008: 17).

Thus, the creation of new meaning is critical for continued understanding and knowing which enables control over decision-action cycles and the commensurate effects that are critical for survival and/or advantage. This is true for market conditions and military operations. This is why knowledge and the management thereof are important in the knowledge era.

La Grange (2006) raises questions by juxtaposing the private sectors' value proposition for knowledge with that of the public sector. The La Grange (2006) study is set against an economic value motive stemming from the advantage motive for private sector players. By exploring the relevant issues of governmental mandates, two levels of KM enablers from a South African perspective are proposed; that of organisational or departmental imperatives and those of national imperatives. La Grange (2006) concludes that the relevance of KM for public sector organisations is closely coupled to governmental objectives which in broad can be summarised as service delivery, security, prosperity and stability both internally and from a foreign relations perspective.

These objectives are typically derived from the "freedoms" articulated by the late President Mandela as reflected in the NPI (2004: 24). Of particular relevance is "freedom from suppression and freedom from fear" (NPI, 2004: 24 in La Grange, 2006: 32), which is, of course, a national (governmental) imperative - providing a distinctive mandate for the SA DOD.

La Grange (2006) provides a concise overview of why KM is important for economic development by providing arguments for people development, knowledge flow between scientific endeavours and industry, required regulatory reforms, increased attractiveness for foreign direct investment, etc. However, nothing is said about the link between security and development (some refer to this as a nexus) and the importance of military KM in support of these development agendas. For example, the SA DOD has a research and development budget in excess of Rm500 annually, supporting innovation activities at national scientific institutes (i.e. the CSIR) and within the defence industry (i.e. Denel SOC Limited). In parallel, the SA DOD has a very large defence matériel acquisition footprint within the South African defence industry, the primary agent for innovation uptake and further development and manufacturing initiates. The SA DOD is thus a key role-player in national innovation activities. Yet, defence as a national imperative and/or the SA DOD as a national department does not engage in coherent and integrated KM as an advantage multiplier.

That said, governments have a responsibility to manage nationally owned knowledge (as one of the resources at its disposal) to ensure internal/organisational effectiveness and efficiency, national security as well as national competitiveness from an economic perspective. For the purposes of this dissertation, the researcher is particularly interested in the national security dimension – with specific reference to the role of the SA DOD.

The SA DOD has a responsibility to the public and government to manage its resources effectively, efficiently, economically (PFMA, 1999). One of the key resources for the SA DOD to manage in the knowledge era - *is knowledge.* This is a prerequisite to remain relevant to the South African security and defence establishment and useful to the SA government in matters of security, defence and foreign policy initiatives. This answers the question – *should the SA DOD be interested in KM*? This critical question is not just answered positively from the perspective of public interest and the legislative framework, but also earlier in the dissertation the importance of knowledge and the management thereof were articulated in terms of its importance for adaptability, flexibility, responsiveness, cost-effectiveness, innovation, knowledge retention, survival and sustainable advantage for the SA DOD. It is for this reason that the researcher posed the question – *why the perceived disinterest in KM by the SA DOD?* This question is addressed in the document analysis chapters (dissertation Chapters 5 and 6) and questionnaire (dissertation Chapter 7).

The discussion above informs the argument why the SA DOD should consider implementing KM (SRQ 2). The next section addresses important issues to be considered when attempting KM. The issues discussed in the following section informed the proposed SA DOD KM model (part of SRQ 4). Thus, understanding that KM is important from several perspectives with the nuances, types and 'ba' of knowledge in mind – let us now consider what is required from a management perspective for it to have a positive, sustainable impact on organisational survival and advantage.

2.6 AN ORGANISATIONAL PERSPECTIVE OF KNOWLEDGE MANAGEMENT

> *"Firms are increasingly investing in [IC], but the process of deciding where and how to invest remains relatively undisciplined, resulting in disappointing returns and wasted resources."* (Seemann, *et al*., 2000: 9).

The quote from Seemann above reflects the disillusionment phase through which KM had to thrust in order to grow into a recognised management discipline. Practised widely by progressive business organisations, governments and leading militaries; the primary differences between business KM and public sector KM are arguably motive (profit vs. service delivery) and possibly the suite of KM processes that different government functions employ to deliver on their required service delivery objectives and products. Typically also, KM models used by different governmental functions will vary for the same reason. Militaries, being a critical component of public service due to their defence and national security mandate, will arguably have the most complex requirement for KM due to their mandate and organisational complexity. In order to understand how KM fit into organisational strategy, the following KM characteristics shape its implementation success:

- "Knowledge management is part of a long-term strategy and not a short-term solution;
- knowledge management can be expensive;
- part of the benefits created by knowledge management initiatives can be seen much later and is difficult to measure and thus justify the funds allocated to them;
- [requires] strong support from top management [also Seemann, *et al*., 2000: 14];
- [must] contributes to achieving the goal of the organization;
- … requires hybrid solutions that include people, business culture and technology;
- … is a continuous process; and
- knowledge is never managed fully, and sharing and using knowledge is not a natural activity in humans." (Črnjar & Dlačić, 2014: 978-979).

Yadav & Singh (2013) and several other writers are of the opinion that KM processes and infrastructure are also critical variables to KM success. These will be discussed next in order to understand which of these are important from a KM model perspective.

2.6.1 Leadership and Management

> *"Leadership plays a key role in ensuring success in almost any initiative within an organization."* (Hasanali, 2002: 1).

Management theory development focussed for decades on effective and efficient business process development (La Grange, 2006). Changes in the current economic realities are challenging the status quo of several of the management theories. KM, as a distinct management science, responds directly to changes in the economic realities, focussing on the management of knowledge as the primary resource for the establishment and maintenance of organisational survival and

advantage. The successful implementation of KM initiatives is, however, contingent on clear leadership (Holsapple & Joshi, 2000b, Hasanali, 2002 and several authors in Berraies, *et al*., (2014).

Management must be clearly separated from leadership as a construct. Management is important from a process execution perspective whereas leadership is important to direct management efforts but also from an innovation perspective (i.e. first mover advantage). Yadav and Singh (2013: 196-197) states that -

> "Managing people who are willing to create and share knowledge is [*sic*] crucial task and finding new sources of motivation to increase people participation in knowledge sharing is a real challenge for organizations (O'Dell & Grayson 1999; Migdadi 2005). … However, people will attempt to create new knowledge only if their organization has an environment that encourages forming T-shaped skills and provides a systematic management of these skills (Lee & Choi 2003; Migdadi, 2005)".

T-shaped skills are vital to knowledge creation and refer to - "… the degree of understanding by employees their own and others' task areas … combine theoretical and practical knowledge and enlarge their ability by integrating varied knowledge assets, across numerous areas and therefore create new knowledge" (Lee & Choi, 2003 in Berraies, *et al.*, 2014: 10). These ideas are supported by several authors such as Shajera and Ahmed (2015).

Management as a social construct is just as nebulous from a definitional perspective as is knowledge (Uit Beijerse, 1999). In order to understand and apply KM, one needs to do the same for management. Management is defined as - "… strategy-driven motivation and facilitation of people, aimed at reaching the organisational goals" (Uit Beijerse, 1999: 99). The definition clearly identifies the requirement of HRM as well as planning. It includes activities such as coordination and control as mentioned by Holsapple and Joshi (2000: 239). Thus, when management as a construct is applied to knowledge as a construct then it translates into '*strategy-driven motivation and facilitation of IC, to reach organisational goals*'. These goals are typically linked to effects and advantage in the broadest sense.

Other tangible organisational resources do not manage or lead but are managed by people. For example, software and IT does not manage, but enable people to manage more efficiently and with enhanced sophistication, enabling decision-making, action, effects and advantage at all levels of the organisation. Knowledge in itself does not manage or lead but is utilised by people to manage and lead.

Nonaka, Toyama and Konno (2000) in Berraies, *et al.*, (2014: 9) state that leadership - "… provide the knowledge vision, develop and promote sharing of knowledge assets, create and energise 'ba' and enable and promote the continuous spiral of knowledge creation". Thus, whereas management has an optimisation and performance focus; leadership has a development and innovation focus and is more dynamic- corresponding to the dynamic nature of knowledge. The ultimate goal is to lead excellence in management.

Marshal (2007) dedicates an entire study to state the important linkages between leadership, knowledge and KM. Calabrese (2000: 37) in Marshal (2007: 11-12) states - "People want their leaders to set the tone, and create the management practices and organizational structures and

policies that will form a culture receptive to knowledge sharing and facilitated through technology tools and networks to achieve a learning-enabled enterprise.". Calabrese (2000) links several KM CSFs in the quote above – people management, leadership, organisational structures, policy, culture, technology and learning.

Key leadership elements in the definition of management are "motivation" and "facilitation" (Uit Beijerse, 1999: 99). When considering Yukl's (2006) definition of leadership, there is a common denominator in management (when defining management as above), leadership and KM; that is 'people'.

Holsapple and Joshi (2000: 241) state that - "This distinguishing characteristic of leadership is that of being a catalyst through such traits as inspiring, mentoring, setting examples, engendering trust and respect, instilling a cohesive and creative culture, listening, learning, teaching (e.g. through story-telling), and knowledge sharing.". Berraies, *et al*., (2014) provides empirical support for this statement. The statement identifies clearly the relationship between organisational culture and learning organisations. The statement also insinuates a particular leadership style.

Politis (2001), Crawford (2005) and Migdadi (2005) in Hassan and AL-Hakim (2011); and Crawford (2005), Migdadi (2005), AL-Hakim and Hassan (2012) in Berraies, *et al*., (2014: 20) propose a distinct type of leadership – i.e. transformational leadership[42] – as a CSF and enabler for KM implementation. Crawford (2005) in Hassan and AL-Hakim (2011: 96) states - "…transformational leadership styles leads to the creation of knowledge culture in the organization, which leads to successful implementation of KM processes and to more innovation". These elements are considered KM CSFs. However, Berraies, *et al*., (2014: 20) found, contrary to the research done by AL-Hakim & Hassan (2012) and Kumar, Jain and Rajiv (2013), that transformational leadership only positively affect part of the knowledge creation process (i.e. socialisation and externalisation from SECI). Bryant (2003) in Berraies, *et al*., (2014: 20) proposes transactional leadership[43] to be appropriate for knowledge exploitation by organisations. Thus, KM champions within organisations will have to have a diverse set of leadership skills to cope.

People lead, are lead, manage and are managed, and it is people that create and acquire knowledge and knowledge reside in people. This makes leadership, management and HRM critical for KM success, based on the complex relationships between these activities. Leadership is not just a case of personal style (transformational, transactional, etc.) but also one of organisational performance, for example, process leadership. Singh (2008) propose arguments for a positive relationship between leadership style and advantage. Trust and leadership are two concepts that are inseparable (Cloete, 2007) and are intrinsic elements of organisational culture, all posited as KM

[42] "Transformational leadership can be seen when "leaders and followers make each other to advance to a higher level of moral and motivation" (Burns, 1978). Bass (1985) built on Burns (1978) work and described transformational leadership as a style of leadership that transforms followers to rise above their self-interest by altering their morale, ideals, interests, and values, motivating them to perform better than initially expected." (Keskes, 2014: online) This is the type of leadership where leaders want to achive 1+1= 3 or more; or a total benefit greater than the sum of the contribution.

[43] "Transactional leadership (Bass, 1985; Burns, 1978) refers to a dynamic exchange between leaders and their subordinates, in which the leader establishes specific goals, monitors progress, and identifies rewards that can be expected upon goal achievement. It involves an exchange process between the leader and the followers, intended to increase followers' compliance to the leader and to the organizational rules (Yukl, 1998)." (Ibid., online) This type of leadership wants to achieve 1+1=2 or compliance.

CSF. Cloete (2007) addresses the symbiotic KM-trust relationship in government. Cloete (2007) posits (South Africa perspective) that KM will increase trust in government.

Cloete (2007) proposes communication (by means of electronic media and IT) as the most appropriate means to manage this trust relationship, pointing to ICT as another important component of KM – discussed extensively later in the dissertation. Abdullah and Date (2009) reviewed the KM body of knowledge (from definitions to perspectives), after which they suggested a public sector KM model. These writers draw heavily on authors such a Nonaka and Takeuchi (KM spiral), Drucker (management sciences) and even reach back to Plato. One of these is the appointment of a Chief Knowledge Officer (CKO) and employing an integrated ICT infrastructure/architecture as KM enablers.

Who leads KM then? La Grange (2006) states that KM is perceived as a leadership responsibility and not everybody's responsibility. KM leadership and management best practices are the establishment and appointment of a CKO (King, Marks, & McCoy, 2002; Dayan, 2006 and King 2009), KM steering committees and change agents. A CKO is essentially a product of the knowledge era (Webb, 2006). A CKO has been appointed in many business organisations since the 1990s' to drive KM initiatives (Holsapple & Joshi, 1999 and Webb, 2006). Holsapple and Joshi (2000: 236) state - "… more than 40% of Fortune 500 companies have chief knowledge officers [circa 1996]".

The position commonly known as CKO goes by various other names such as KM Champion, Director of Knowledge Networking and Futurist-in-Chief, pointing to the contextual nature of KM and how it should be lead. It is critical for organisations to have a central position that is responsible for the successful implementation of KM initiatives (DeTienne, Dyer, Hoopes, & Harris, 2004: 36). CKOs have the responsibility to convert - "KM theories into practice and delivering bottom line [*sic*] benefits from knowledge initiatives" (Webb, 2006: 268). Several articles have been published on the importance of a CKO in originations, stating their responsibility for KM strategy and implementation.

A critical skill CKOs must possess is a clear understanding of ICT systems as KM enablers (Webb, 2006). Most of all, and based on the understanding articulated by numerous writers that KM is about people, technology, processes and intangible issues such as organisational culture and leadership (DeTienne, *et al*., 2004); Webb, 2006), CKOs must be integrators of organisational IC distinctly aimed at enhancing the quality of decisions, action, effects and advantage. For this, a hybrid transformational-transactional leadership style is proposed.

More than often CKOs will have to drive organisational change programmes in order to change organisational culture, training regimes, leadership and management styles and possibly organisational structures in order to unlock the organisational knowledge potential.

2.6.2 Knowledge Management Processes/Activities

KM can only be implemented with action (activities or processes). Implementation of KM processes as an organisational strategy is very important for organisational performance improvement (Tubigi, *et al*., 2013). Most KM models focus on processes in a hierarchical format (Ďurišová, 2011). Processes are action and effect based, i.e. processes cannot occur without some

sort of action, initiated by cycles of decision-making and action but with the desired effect in mind. Yadav and Singh (2013: 196) posit KM processes as a mechanism for -

> "… collecting and identifying useful information (i.e. knowledge acquisition), transferring tacit knowledge to explicit knowledge (i.e. knowledge creation or transfer), storing the knowledge in the repository (i.e. organizational memory), disseminating it through the whole organization (i.e. knowledge sharing), enabling employees to easily retrieve it (i.e. knowledge retrieval) and exploiting and usefully applying knowledge (i.e. knowledge leverage).".

"[K]nowledge is viewed as a process, then the implied KM focus is on the knowledge flow and the processes of creating, sharing, and distributing knowledge, if knowledge is viewed as an object, then KM should focus on the building and managing of knowledge stocks" (Alavi and Leidner (2001) in Tubigi, *et al*., 2013: 3). Managing knowledge as a stock possibly defeat the purpose of KM. Knowledge management seeks to leverage knowledge and gain an advantage, not merely hoarding or warehousing it. Knowledge stocks can only be built and managed by means of KM processes, i.e. creating, sharing and using knowledge. Thus, this dissertation approaches knowledge and KM with a process-view.

Third generation KM (i.e. KM from the perspective of 2005 and beyond) focuses on KM processes as the keys to unlock the inherent potential of the management science (Tuomi (2002: 79 in La Grange, 2006). Currently, the KMI underwrites this approach, taught by the Institute internationally. Of course, KM processes and activities are not automatically correlated with success and advantage. KM processes and activities require leadership and specific culture to be effective (Alrubaiee, *et al*., 2015) – to be discussed later on in the dissertation.

Malhotra (2003) brings the importance of action and processes closer to practice. Malhotra (2003) states that knowledge has to be present for any form of value creation. However, the mere presence of knowledge or existence of knowledge does not generate or guarantee value creation. Value can only be generated when there is some form of action (uni- or multilateral). These actions need to be integrated into processes.

This should not be confused with the work done by Jung, Choi and Song (2006: 21) describing - "… process-orientated" KM. Jung, Choi and Song (2006) and various other writers support the importance of processes in order to manage knowledge; however, process-orientated KM refers to the knowledge inherent and/or generated by business processes. As such, Jung, Choi and Song (2006) suggest an integrated architecture for process-orientated KM systems (KMS)[44] and business process management systems that are important for the following discussions about KM enablers.

There exists no finite list of KM processes and there is variation in agreement on core KM processes (Holsapple & Joshi, 2002b in Arthur, 2013: 3-4). Since 2002, the level of agreement has

[44] "KM System: A KM system is the overall product produced when the KM process model is applied. It consists of a number of KM domains and according, defined KM processes that are linked with other organisational processes, and it incorporates tools and techniques to be used in these. This includes co-ordination processes for the tracking and possible modification of the operational processes. Thus, a KM system is a complex unit of different layers (co-ordination processes and operational processes for each KM domain) dealing with the different aspects of KM: influencing culture, facilitating creation and sharing of knowledge, providing tools and methods, and monitoring KM processes." (Kucza, 2001: 18-19)

improved. Refer to Appendix B of the dissertation for a comprehensive (possibly not finite) table on KM processes. As business and military operations grow, adapt and evolve – so do the processes that shape the collective actions that make operations possible. KM processes are subject to this state of flux. That said, several academics and writers agree on a number of KM processes. The researcher lists several authors and their predisposition towards certain perceived KM processes in Table 2.6. Agreement on certain processes is quite evident. Semantics and synonyms form a large part of the list. The following is a compendium of KM processes and the authors that support them -

Table 2.6: Knowledge Processes/Activities

Activities/Processes	Agreement	Semantics/Synonyms
Procure, organize, store, maintain, analyze, create, present, distribute and apply. Holsapple & Whinston (1987) in Arthur (2013: 3-4)	Create, Organise	Acquire. Associated activities – procurement, importing and absorbing. Create. Associated activities – development, synthesize, adapt, construction, combine, establishing, generate, socialise, internalise, combine, externalise, prototyping, embodiment. Secure. Associated activity – protect. Organising. Associated activities – identifying, collect, capture, mobilization, diffusion, commoditization, codification, sense-making, indexing, filtering, linking, screening, classification, cataloguing, interconnecting internal and external sources, inventories, hold, store, retrieve, evaluate, compare, process, consolidating, preservation, retention, integration, maintaining, archiving, translating/repurposing, access, refining, validate and disposal. Share. Associated activities – distributing,
Combining, distribution, generating and developing Wiig (1991) in Zhang (2013: 24)		
Survey, categorize, analyse, elicit, codify, organize, appraise, evaluate, value, synthesize, handle, use, control, leverage, distribute, automate, create, manifestation, and transfer. Wiig (1993) in Holsapple & Joshi (1999: 8 and 13)	Create, Organise, Use	
Shared and creative problem solving. Importing and absorbing technological knowledge from the outside of the firm. Experimenting prototyping. Implementing and integrating new methodologies and tools. Leonard-Barton (1995) in Holsapple & Joshi (1999: 13) and Arthur (2013: 3-4)		
Sense-making (includes ‘‘information interpretation’’). Creation (includes ‘‘information transformation’’). Decision making (includes ‘‘information processing’’). Choo (1996) in Holsapple & Joshi (1999: 13) and Arthur (2013: 3-4)	Create	
Share, create, identify, collect, adapt, organize and apply. Andersen & APQC (1996) in Holsapple & Joshi (1999: 13) and Arthur (2013: 3-4)	Share, Create, Organise	
Initiation (recognize knowledge need and satisfy that need). Implementation (knowledge transfer takes place). Ramp-up (use the transferred knowledge). Integration (internalize the knowledge). Szulanski (1996) in Holsapple & Joshi (1999: 13) and Arthur (2013: 3-4)	Use	
Development (conceptualization, review, internalization, sharing). Use (storing, distributing, applying, reviewing). Taylor (1996) in Holsapple & Joshi (1999: 5)	Share, Use	
Codify and measure Lundvall & Johnson (1994) in OECD (1996: 12)	Measure	
Construction, embodiment, dissemination, use, retention and refinement.	Use	

Activities/Processes	Agreement	Semantics/Synonyms
De Jarnett (1996) in Tubigi, *et al*. (2013: 3)		disseminating, transfer. Use. Associated activities – apply, application, ramp-up, integration, applying, act, leverage. Measure. Associated activities – Evaluate, compare, assessing, appraise, auditing,
Acquisition (knowledge creation and content development). Indexing, Filtering, Linking (screening, classification, cataloguing, integrating, and interconnecting internal and external sources), Distributing (packaging and delivery of knowledge in form of Web pages), Application (using knowledge). Alavi (1997) in Holsapple & Joshi (1999: 11) and Arthur (2013: 3-4)	Acquire, Create, Use	
Knowledge economies (Construction, Dissemination, Embodiment, Use). (Demarest (1997) in Holsapple & Joshi, 1999: 5)	Use	
Inventorise, analyse, plan, process, develop, distribute, combine, hold, evaluate, compare. Van der Spek and Spijkervet (1997) in Holsapple & Joshi (1999: 10 and 13) and Arthur (2013: 3-4)		
Review, conceptualise, reflect and act (act consist of acquisition, learning, distributing, combining, consolidating). Wiig (1997) in Ďurišová (2011: 48)	Acquire	
Process or practice of creating, acquiring, capturing, sharing and use. Quintas *et al*. (1997) in Tubigi, *et al*. (2013: 3)	Acquire, Create, Share, Use	
Creation, manifestation, use and transfer. Wiig (1998) in Arthur (2013: 3-4)	Create, Use	
Generating, organizing, developing and distribution. Apostolou & Mentzas (1999) in Ďurišová (2011: 48)	Organise	
Acquiring, selecting, generating, internalizing and externalizing. Holsapple & Joshi (2000: 237)	Acquire	
Enhancement, share, sold, used, renew and productivity (generate superior business results). Seemann, *et al*. (2000: 5)	Share, Use	
Generate, store, distribute and apply. Mertins, Heisig & Vorbeck (2001) in Zhang (2013: 24)		
Creation, integration and dissemination. Fischer & Ostwald (2001) in Ďurišová, (2011: 48)	Create	
Creation, storage and sharing, as well as the related activities. Kucza, 2001: 16)	Create, Share	
Creation, storage/retrieval, transfer and application. Alavi & Leidner (2001) in Ďurišová (2011: 48)	Create	
Creation, sharing and distribution (process focus). Alavi & Leidner (2001) in Tubigi, *et al*. (2013: 3)	Create, Share	
Building and managing of knowledge stock (object focus). Alavi & Leidner (2001) in Tubigi, *et al*. (2013: 3)		
Creation, codification, transfer and application. Alavi & Leidner (2001) and Schwen, *et al*. (1998) in Zhang (2013: 25)	Create	
Identifies, locates, creates or acquires, transfers, converts and distributes. Walters, 2002 in Shajera & Ahmed (2015: 89)	Acquire, Create	
Creation/acquisition, modification, immediate use, archiving, transfer, translation/repurposing, user access,	Acquire, Create, Use	

Activities/Processes	Agreement	Semantics/Synonyms
and disposal. Bergeron (2003) in Tubigi, *et al*. (2013: 4)		
Acquiring, creating, sharing, capturing and using. Jashapara (2004) in Tubigi, *et al*. (2013: 3)	Acquire, Create, Share, Use	
Acquisition. Yang & Wang (2004) in Tubigi, *et al*. (2013: 3)	Acquire	
Storage, retrieval, diffusion and presentation, application and creation. Lettieri, *et al*. (2004) in Tubigi, *et al*. (2013: 3)	Create, Organise	
Capturing (data entry, scanning, voice input, interviewing, brainstorming), organizing (cataloguing, indexing, filtering, linking, codifying), refining (contextualizing, collaborating, compacting, projecting, mining) and transfer (flow, sharing, alert, push). Awad & Ghaziri (2004) in Ďurišová (2011: 48)	Organise, Share	
Creating, sharing, structuring, using, and auditing. Sağsan (2006) in Ďurišová (2011: 48)	Create, Share, Use	
Generation, development, codification, storage, transferring, sharing and utilisation. Zaim (2006: 3) in Tubigi, *et al*. (2013: 3)	Share, Use	
Capture, transfer, use, acquire, collaborate, integrate, experiment, create, generating, assessing, assemble, storage, facilitating, representing, embedding, application, conversion, exploit, measuring and protecting. Lee & Lee (2007: 23) (referencing several authors)	Acquire, Create, Measure	
Creation, development, codification, storage, distribution, sharing and utilisation. Zaim, Tatoglu & Zaim (2007: 54)	Create, Share	
Generation, development; codification, storage; transfer, sharing and utilization. Zaim, *et al*. (2007) in Tubigi, *et al*. (2013: 3)	Share	
Create, share and utilise. Wu & Lee (2007) in Ďurišová (2011: 45)	Share, Create	
Creation, integration, accumulation, utilization, learning and sharing. Shieh-Cheih, Fu-Sheng, & Kuo-Chien, (2005) in Yadav & Singh (2013: 195)	Create, Share	
Creation, codification, transfer and use. Draghici & Draghici (2008) in Ďurišová (2011: 48)	Create, Use	
Creation (discovery, capture), storage (retention, organization), transfer (sharing, distribution), and use/maintenance. Ribière (2008) in Ďurišová (2011: 48)	Create, Organise, Share, Use	
Creation, acquisition, refinement, storage, transfer, sharing and re-use	Create, acquire, share	
Location, sharing, experiment and creation. Zack, *et al*. (2009) in Tubigi, *et al*. (2013: 3)	Create, Share	
Acquisition, creation, storage, distribution, use and maintaining. Fong and Choi (2009) in Tubigi, *et al*. (2013: 3)	Acquire, Create, Use	
Creation, use and transfer. Singh & Soltani (2010) in Tubigi, *et al*. (2013: 3)	Use, Create	
Creating, organising, storing, sharing and utilising. AL-Hakin & Hassan (2011: 953-954)	Organise, Create, Share	

Activities/Processes	Agreement	Semantics/Synonyms
Capture, create, refinement, validate, codification, store/retrieve, access, distribution, sustain, update, application, organisation, retention, dissemination, utilisation and disposal Anand & Singh (2011: 935)	Create, Organise,	
Creation and acquisition. Mills & Smith (2011) in Tubigi, *et al*. (2013: 3)	Acquire, Create	
Creation. Mishra & Bhaskar (2011) in Tubigi, *et al*. (2013: 3)	Create	
Identification, acquisition, transferring, storage, sharing and application. Zwain, Teong, & Othman, (2012) in Alrubaiee, Alzubi, Hanandeh & Ali (2015: 991)	Acquire, Sharing	
Acquisition (collecting and identifying useful information). Creation or transfer (transferring tacit knowledge to explicit knowledge). Organisational memory (storing the knowledge in the repository). Sharing (disseminating it through the whole organization). Retrieval (enabling employees to easily retrieve it). Leverage (exploiting and usefully applying knowledge). Yadav & Singh (2013: 196)	Acquire, Creation, Sharing,	
Creation, acquisition, modification, use, transfer, archiving, translating/repurposing, access and disposal. Yadav & Singh (2013: 199)	Acquire, Creation, Use	
Creation, acquisition, modification, use, archiving, transfer, translation, user, access and disposal. Tubigi, *et al*. (2013: 2)	Acquire, Creation, Use	
Acquisition, conversion, application, protection, storing. Shajera & Ahmed (2015: 90)	Acquire	
Identification, acquisition, transfer, storage, sharing and application. Alrubaiee, Alzubi, Hanandeh, & Ali (2015: 992)	Acquire, Sharing	

Adapted from Holsapple & Joshi (2002b) in Arthur (2013: 3-4) and expanded with views of several other writers.

The mere listing of these processes does not provide insight into the complex interactions between these in order to achieve coherence and integrated KM. However, flexibility in organising these processes are important to be able to cope with dynamic operational environments and the dynamic nature of knowledge. Some authors also combine KM processes into so-called KM Lifecycle models. Nissen, Kamel and Sengupta (2000: online) on the left and an adapted version by Jung, Choi and Song (2006: 23) on the right are two such models. The cycles listed in Figure 2.11 suggest all the processes involved in KM. When considering the list in Table 2.6 this is clearly not the case. The KM lifecycles are also prescriptive and lack flexibility. For example, knowledge could be acquired, used immediately to create new knowledge and then only shared to be leveraged in an attempt to achieve an advantage. Again, the semantics are clearly visible in Figure 2.11 below -

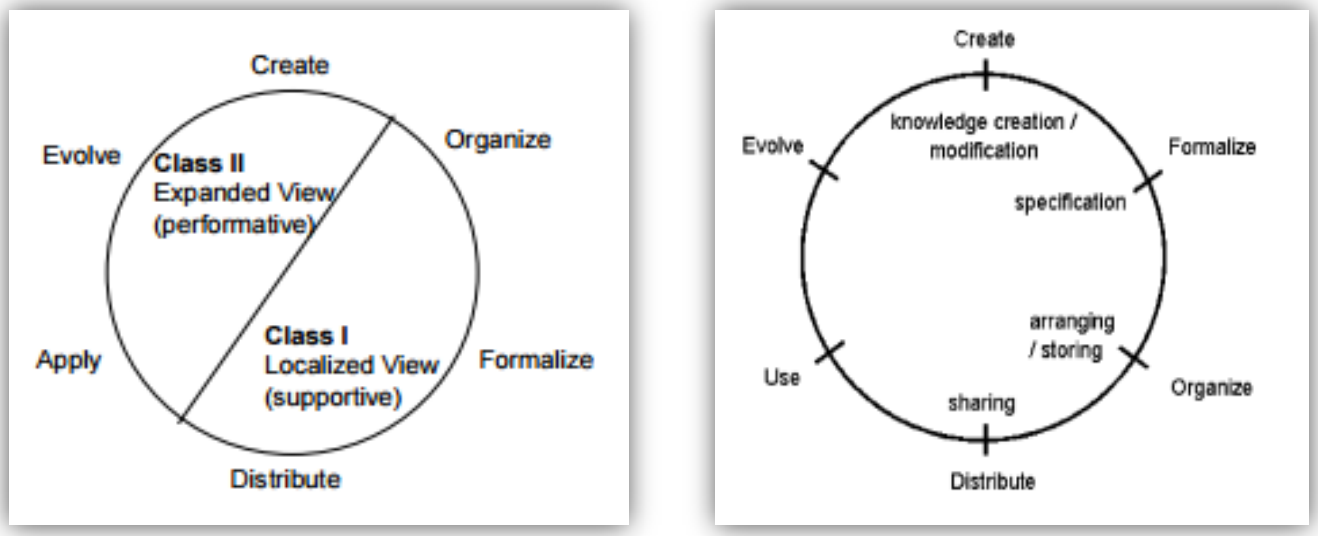


Figure 2.11: Knowledge Management Life Cycle

Source: Nissen, Kamel and Sengupta (2000: online) and Jung, Choi and Song (2006: 23).

There are several other Knowledge Life Cycle models as discussed by Ďurišová (2011). Apart from the semantics inherent in the various proposed Knowledge Life Cycle elements, not all organisations will agree to a singular KM lifecycle. It is the researcher's view that core, organisation specific, KM processes should be identified that supports IC development and sustainment within each organisation and operational environments. Core, organisation specific KM processes could then be supported with a portfolio of secondary KM processes as required and dictated by the complexity of evolving internal and external environments. Some of the core, academically recognised, KM processes (keeping semantics in mind) are knowledge creation, - acquisition, - organising, - sharing and – use, derived from the list above. These are not to be seen as a life cycle or hierarchy. Knowledge and the management thereof are dynamic and require considerable flexibility and adaptability to facilitate space to leverage organisational IC in the quest for a desired effect and advantage.

Based on earlier views as to the importance of knowledge *vis-à-vis* advantage, it would have been expected that the security (protection as a process) of knowledge would have been a recurring requirement. This might be the case in reality, but not much is published about this. Security and/or protection are only mentioned by a very limited number of academics and writers as a distinct process consideration. This could possibly be a result of an IT/IM mindset assuming data/information/knowledge security or protection to be implicit in IT enablers, and/or other organisational policies or inherent in every KM process. However, it is the contention of the researcher that without identifying knowledge protection as a distinct, core KM process - competitive advantage might be lost due to organisational knowledge vulnerabilities resulting from negligence and/or oversight. The very recent events surrounding Wiki Leaks and Edward Snowden, widely published, are cases in point. Consider the following list by Ďurišová (2011: 49) -

Table 2.7: Knowledge Life Cycles

Author	Stages of KLC
Probst (1998)	**In hierarchical order:** Identification, acquisition, development, distribution, preservation, use of knowledge.
Bergeron (2003)	Knowledge creation/acquisition, modification, immediate use, archiving, transfer, translation/repurposing, user access, and **disposal**.
Firestone & Mc Elroy (2003)	"New KM": knowledge claim formulation, information acquisition, knowledge integration, knowledge validation, **individual and group learning**.
Birkinshaw & Sheehan (2002),	**S-curve**: creation, mobilization, diffusion and commoditization.
Du Preez & Louw & Lutters (2008)	Create knowledge (R&D), identify & collect, disseminate, apply, and **obtain value** from knowledge.
Nonaka & Takeuchi (1995)	**SECI model** (4 modes of knowledge conversion): socialization, externalization, combination, and internalization.
O'dell et al. (Sağsan, 2006)	**Interdependent** steps: organizing, sharing, adapting, using, creating, defining, and collecting of knowledge.

Source: Ďurišová (2011: 49).

For the purposes of this dissertation the following core KM processes, as distilled from discussion and assessment thus far in the dissertation are as follows -

- Acquisition – focussed buying of IC at the right time, available to the right 'ba', in the most advantageous manner.
- Creation – focussed development of IC at the right time, available to the right 'ba', in the most advantageous manner.
- Organising – collective and focussed KM-related activities that ensure the sense-making, enhance understanding and new meaning based on available IC at the right time, available to the right 'ba', in the most advantageous manner.
- Securing – collective and focussed KM-related activities that protect IC in the interest of gaining and sustaining advantage and delivering desired effects with due consideration for all other core KM processes.
- Sharing – collective and focussed KM-related activities that ensure the transfer of IC at the right time, available to the right 'ba', in the most advantageous manner.
- Use – collective and focussed KM-related activities, IC application and leveraging at the right time, available to the right 'ba', in the most advantageous manner.
- Measure – collective and focused action through KM-related activities that seek to identify the level of impact of IC during the quest for desired effects and advantage.

These will inform the construction of a conceptual SA DOD KM model. Knowledge management architecture and CSF are important aspects for inclusion in a conceptual SA DOD KM model and will be discussed henceforth.

2.6.3 Knowledge Management Architecture, Infrastructure and Enablers

Knowledge management infrastructure is proposed to be the spine of KM and an organisational mechanism for knowledge processes (Yadav & Singh, 2013). KM architecture and infrastructure enables KM processes. KM infrastructure consists of leadership, IC, organisational culture, organisational structure and technology (mostly IT) (Davenport & Völpel, 2001 in Zaim, Tatoglu & Zaim, 2007; Tiwana, 2000; Halawi, *et al.*, 2005; Yadav & Singh, 2013). The infrastructure components are visible in the discussion on IC earlier in the dissertation, the KM characteristics alluded to above and the KM CSF discussed hereafter.

Berraies, *et al*. (2014) describes KM infrastructure elements as KM enablers. Based on empirical research, Berraies, *et al*. (2014: 12) proposes a KM enablers theoretical model that includes organisational culture (trust, collaboration, learning and incentive or rewards), transformational leadership, organisational structure (decentralised and low formality), IT support and T-shaped skills. These KM enablers are then distinctly linked to the SECI knowledge creation processes and posited to enhance organisational innovation capabilities. The KM infrastructural components or KM enablers only really become functional when activities and processes are designed and implemented in support of organisational strategy execution.

A very apt way to approach a more detailed discussion on the KM infrastructure is to consider KM CSFs because they involve consideration of both the KM infrastructure, a KM enabler's perspective, activities and processes as well as allude to best practices. Incidentally, there are uncanny similarities between KM CSFs, KM infrastructure and KM enablers. In the researcher's opinion, these are the fundamentals to successful KM.

2.6.4 Knowledge Management Critical Success Factors & Related Best Practices

During the past 15 years (at least) – KM CSF and best practices for successful KM implementation have been identified. Knowledge management CSFs reveal the critical organisational components requiring closer investigation due to their perceived impact on organisational performance. Closely related to KM CSFs and stemming from these factors are KM best practices. This section touch on some of these CSF and best practices in support of SRQ 4 - How should the SA DOD manage its knowledge?

In contrast, some academia tackles such a discussion from a KM barriers perspective (e.g. BenMoussa, 2009 and Črnjar & Dlačić, 2014). This dissertation will consider KM barriers from a positive perspective, i.e. if an aspect is considered a KM barrier then from the opposite perspective it becomes a KM CSF. For example, if a lack of IT infrastructure is a barrier to KM, then relevant IT infrastructure becomes a CSF. The barriers to KM will thus not be discussed separately.

Focussing the discussion on KM CSFs, Hassan and AL-Hakim (2011) and AL-Hakim and Hassan (2011) propose a number of KM CSFs in their studies based on the relationship between KM, innovation and organisational performance. They identified seven commonly accepted KM CSFs as human resource management (HRM), IT, leadership, organisational learning, - strategy, - structure and - culture (Holsapple & Joshi (2000), Hassan & AL-Hakim, 2011: 95 and AL-Hakim & Hassan, 2011: 88). Alazmi and Zairi (2003) in Dayan (2006: 3-35) prioritise the KM CSF as sharing, technology infrastructure, top management support, knowledge strategy, training, culture,

transferring knowledge, creating knowledge and knowledge infrastructure. The overlap is quite evident.

AL-Hakim and Hassan (2011: 953-954) provide a tabulated academic framework to reinforce their opinion (refer to Appendix B to the dissertation). Appendix B provides a summary of the fundamentals for successful KM implementation, combining those regarded as KM influencers, KM CSFs, KM enablers and best practices. The researcher expands the table with the inclusion of several other academic references.

Črnjar and Dlačić (2014), based on Holsapple and Joshi (2000), conducted empirical research on KM implementation barriers in the Croatian hospitality industry. Črnjar and Dlačić (2014) state that most of the above-mentioned CSFs can be structured more concisely into categories of managerial-, resource - and environmental influence [Holsapple & Joshi, 2000: 239]; and that the most critical KM implementation barriers are found within "… methodology, technology, organization [also in BenMoussa, 2009: 1492], and human capital [also in BenMoussa, 2009: 1492]" and organisational culture (also Sveiby & Simmons, 2002 in Zaim, Tatoglu & Zaim, 2007).

La Grange (2006) identified organisational culture (e.g. rule-based, knowledge-is-power, little or no incentives for knowledge sharing) as a key public sector KM inhibitor, especially when the culture hampers knowledge sharing. Other factors identified by La Grange (2006) are –

- confusion as to who is responsible for KM;
- the bureaucratic and hierarchical structure of government departments slowing down communication and knowledge sharing/transfer;
- complexity as a result of the governments' large footprint exacerbating knowledge transfer/sharing challenges;
- challenges regarding knowledge retention due to staff turn-over, churn and/or natural attrition;
- funding models that affect initiatives such a KM;
- information securitisation;
- measurement of KM initiatives; and
- confusing KM with ICT management or other forms of IM and technology implementation.

Arora (2011: 165) identifies a number of challenges facing public sector KM, notably - "… driving efficiencies across all public services; improving accountability; making informed decisions; enhancing partnerships with stakeholders; capturing the knowledge of an ageing workforce, and; improving overall performance.". These perceived challenges to KM closely match KM CSF. Appendix B provides substantive support for the stated KM CSFs grouped according to their influence (i.e. managerial, resource and environmental in Holsapple and Joshi, 2000: 238). A graphical display of how the perceived KM CSFs and their influences interact to produce organisational learning and projections of the future is depicted in Figure 2.12.

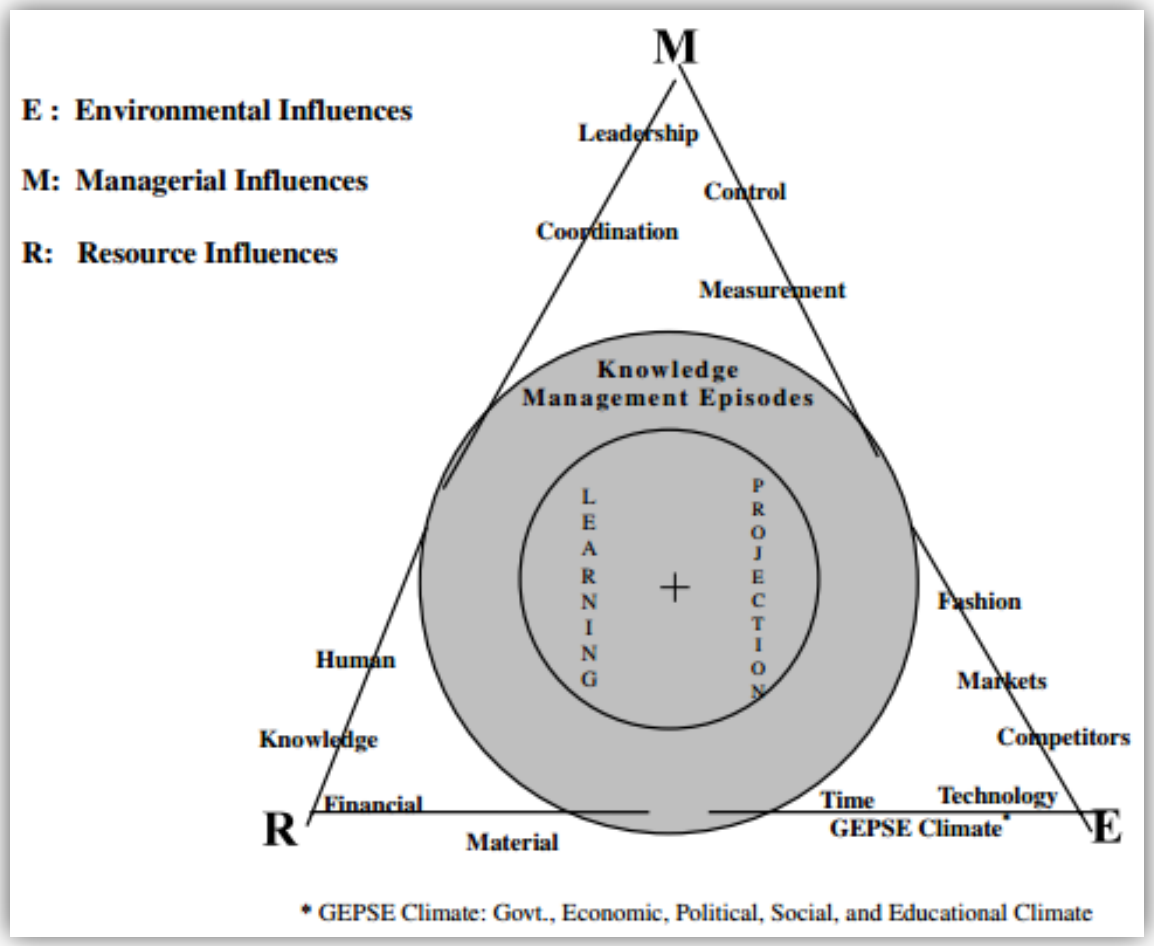


Figure 2.12: Knowledge Management Influencers

Source: Holsapple and Joshi (2000: 238).

A government department or business embarking on the implementation of KM should be well versed in the impact of these CSFs. It simplifies and structures the understanding of where KM affects organisations. KM CSFs cannot be separated into silos and managed as such because they influence each other significantly and differently depending on the organisation type, i.e. structured for innovation or bureaucracy. This brings complexity theory into the discussion, which influences how leadership will be attempted and what culture should be established to execute the organisational strategy successfully. Integration is pivotal to these processes. With leadership and management as constructs discussed already in section 2.1 above, let us delve into other CSF and best practices for KM.

2.6.4.1 Organisational Culture

Several authors[45] position organisational culture vital to successful KM. Zaim, Tatoglu and Zaim (2007: 55) make the point that - "One of the most important and challenging aspects of KM is to enhance the development of a collaborative, trustworthy, emphatic and helpful organizational

[45] Alavi & Leidner, 2001; Skyrme, 1999 and Hauschild *et al.*, 2002 in Zaim, Tatoglu & Zaim, 2007; Hassan & AL-Hakim, 2011; Yadav & Singh, 2013; Berraies, *et al.*, 2014 and De Nadae & Monteiro de Carvalho, 2017; and several others.

culture". Hasanali (2002: 2) defines culture as - "… the combination of shared history, expectations, unwritten rules, and social customs that compel behaviors. It is the set of underlying beliefs that, while rarely exactly articulated, are always there to influence the perception of actions and communications of all employees". Park, Ribière, and Schulte (2004) in Hassan and AL-Hakim (2011: 96) include - "… share basic assumptions" and the fact that organisational culture is used as an enabler to resolve challenges resulting from initiatives to integrate with external and internal business environments.

Human factors are pivotal to both KM and the establishment and maintenance of organisational culture [46]. BenMoussa (2009: 1493) states that the - "… fundamental barrier to motivating people to participate in KM efforts is corporate culture". Berraies, *et al*. (2014: 6-7), based on several authors, adds collaboration, learning and incentives or rewards as critical enablers within the organisational culture. Leadership style has a large impact on how this is achieved, which will be briefly discussed later. Hasanali (2002) is of the opinion that organisational culture will hamper KM initiatives due to the perception of a time constraints to do work as well as KM; organisational reward systems that are not aligned with KM CSF; lack of a common organisational vision and KM vision; and a lack of communicating organisational KM vision, what is being implemented and success stories.

For some academics, the question of the importance of organisational culture is directly linked to the strategic question of how to make culture work for KM and its implementation (Hassan & AL-Hakim, 2011). Zaim, Tatoglu and Zaim (2007: 55) contextualise the importance of organisational culture with the following statement -

> "It is because knowledge is a context-dependent social concept (Lang, 2001 [and BenMoussa, 2009]) and a large part of organizational knowledge is embodied in social processes, institutional practices, traditions and values (Fayard, 2003; Boisot, 1998). Therefore, no matter how powerful the tools and functions of KM are, it is of no use without willing participants and a supportive social and cultural environment (Koulopoulos and Frappaolo, 1999, [BenMoussa, 2009])."

Let us now consider the relationship between organisational learning and KM; as a KM enabler within the context of organisational culture.

2.6.4.2 Organisational Learning

There is a dependence of KM on learning, management, IC and strategy. Seemann, *et al*. (2000: 9) is of the opinion that – "… effective organizational learning is the result of explicit management efforts to build [IC] in support of the firm's strategy. Learning must be aligned with the current business strategy to ensure that knowledge being acquired supports future needs, instead of simply building on historical practices and strengths.". Lytras and Pouloudi (2006) concluded that the ability of organisations to learn is directly related to KM effectiveness. Thus, KM infrastructure must be integrated with learning infrastructure and ICT applications to facilitate knowledge performance.

Hassan and AL-Hakim (2011) found wide recognition for the linkage between organisational learning and enhanced organisational performance. The Hassan and AL-Hakim (2011) study also

[46] Park, *et al*., 2004 and Al-Alawi, Al-Marzooqi & Mohammed, 2007.

found a positive correlation in the relationship between KM, innovation and organisational performance. This positive correlation is important for any organisation that bases its advantage and growth on innovation. López-Cabrales, Pérez-Luño and Cabrera (2009) in Hassan and AL-Hakim (2011) and López, Peón and Ordás (2004) in Berraies, *et al*. (2014) believe that there is a positive linkage between organisational learning and KM and that organisational performance will be further enhanced if there is integration between the organisational culture, -learning and KM. It can thus be safely assumed that there will also be some linkages between learning, organisational performance, organisational culture, innovation and KM.

The link between learning and practice is illustrated by Hill (2005) who explores some interesting concepts relevant to the international business environment. One of the concepts is labelled, learning curve effects of organisational learning. This proposes that learn-by-doing will influence productivity or performance. Learning curve effects result in enhanced performance and productivity due to skill and know-how (sub-sets of IC) development through repetition.

To learn, information and knowledge must be present. The 'ba' relevant to each cluster of information and/or knowledge that impact organisational performance must, therefore, be known and structurally mapped. A primary organisational learning best practice is a construct named, communities of practice. Hasanali (2002) states that the President of the World Bank was instrumental in the establishment of communities of practice throughout the World Bank. The technique is also widely used by the USA military as best practice.

Hasanali (2002) states that best practice organisations have responsible steering committees that provide the strategic guidance and direction of KM initiatives. Hasanali (2002) states that best practice organisations have knowledge owners or functionaries that act as change agents to drive the acceptance, training, KM vocabulary sharing and implementation of KM initiatives. They typically spearhead integrative approaches to KM. However, organisations can employ as many best practices as possible; without a learning culture, the efforts to grow the organisational knowledge will be less than optimal. The same can be said of leadership. Let us now consider the impact of organisational leadership and management on the implementation of KM.

2.6.4.3 Ethics, Legal and Security Considerations

An aspect highlighted by Webb (2006) that is missing from most narratives about KM is legal and ethical considerations. Holsapple and Joshi (2000: 254) asked questions about KM and ethics in a 2000 study. Webb (2006: 269) states that CKOs - "… need to have an understanding of the legal and ethical environment within which KM must operate. Issues such as data protection, corporate governance, freedom of information, confidentiality and privacy need to be borne in mind". Webb (2006) thus link KM ethics to the knowledge protection or security. This aspect of KM receives very little attention in KM literature. Holsapple and Joshi (2000: 240) state in this regard, with emphasis on knowledge security and protection as part of knowledge control -

> "Control is concerned with ensuring that needed knowledge resources and processors are available in sufficient quality and quantity, subject to required security. Two critical issues here are protection of and quality of knowledge resources. Protecting knowledge resources from loss, obsolescence, unauthorized exposure, unauthorized modification, and erroneous assimilation is crucial for the effective management of knowledge. Approaches include legal protection (e.g.

patents, copyrights), social protection (e.g. hiring people who can blend with the current culture and help sustain current values and norms), and technological protection (e.g. security safeguards).".

This quote from Holsapple and Joshi (2000) above is one of the very few that expresses the criticality of knowledge security/protection. From the ethics discussion above, a question is raised; is ethics another key component in KM so often missed because of knowledge commoditisation? Should ethics be a key component of an SA DOD KM model and/or should it be linked to the security component of KM for militaries?

2.6.4.4 Organisational Strategy

There are as many writers on strategy as there are strategies and strategists. Strategy refers to the Greek word '*strategia'*, meaning 'generalship'. The origin is from the Greek words '*stratos*' meaning *army* - and '*ag'* meaning *to lead*. David (2007: 26) refers to the "*strategos*", which Melvin (2010: 6) describes as Greek for 'general' – the person that would execute strategy. This is just the early verbalisation of the construct of strategy. However, strategy formulation and application can be traced as far back as Sun Tzu in his work - The Art of War – 500BC (Grant, 2005: 14 and Melvin, 2010: 6).

Melvin (2010: 5) quotes Sullivan and Harper stating that strategy is essentially an intellectual construct providing *linkages* between current and future dispositions in substantive ways. In other words, a strategy is a plan to unlock the desired future and measured for impact. If that desired future is some form of an advantage then a strategy is a means to achieve competitive advantage or military advantage with. Strategy is also perceived as a KM resource (Holsapple & Joshi, 2000).

Knowledge management must be integrated into an organisational strategy for successful results. Knowledge management is not an island in an organisation, but a method to achieve an advantage with (BenMoussa, 2009: 1495). Supporting the view of BenMoussa - Tubigi, *et al*. (2013) states -"… enhancing and cultivating the individual knowledge of members of an organisation is a clear strategy for developing a continuous organisational learning that can lead to better performance (Nonaka, 1998; O'Dell and Grayson, 1998).". From a strategy perspective, KM is positioned to enable or enhance innovation, product and service improvement, decision-making and organisational flexibility and adaptability (Earl, 2001 in Zhang, 2013) and exploits organisational IA (Lytras & Poudouli (2006). These are all key elements of organisational strategy.

Organisational knowledge (structural capital) and knowledge inherent in its people (human capital) is critical for organisational survival and advantage. This makes KM strategy a necessity for the organisation. This view has broad academic support (refer to Appendix B of the dissertation. Seemann, *et al*. (2000: 9) states that KM strategy may include for example – "… hiring new talent, designing joint projects, implementing job rotations, and altering organizational structures to facilitate the flow of the new knowledge between existing and new businesses.". These activities are easily linked to organisational survival or advantage. Strategy also has strong links with other KM CSFs such as organisational leadership and culture.

Hall, *et al*. (2007) uses a very sophisticated philosophical argument to link knowledge to time (or the time value of knowledge). What these authors essentially say is that knowledge for

decision-making becomes increasingly irrelevant or useless as time passes beyond a certain decision-making point. This view is supported by Alrubaiee, *et al*. (2015) and other writers that support the requirement for knowledge 'at the right time' (Savage, 1996), discussed earlier in the dissertation.

This perceived depreciation of knowledge value relative to a particular situation and/or decisions negatively affect the ability of strategy crafting and/or execution and will invariably hamper leadership and management. The same argument can be cascaded down to operational and tactical levels of decision-making – which incidentally is the foundation for strategy execution.

Figure 2.13: Level and Relationships of Policy and Strategy

Source: Melvin (2010: 11).

Knowledge time value is therefore very relevant to advantage and survival and highlight the requirement for integrated KM and KM being integrated into organisational strategic management, planning and execution to ensure available knowledge is exploited optimally at the most opportune time.

There is a difference between business and the military in at least the motive for crafting and applying the strategy. Business strategy drives enhanced profitability, market penetration, increased market segment, market domination, exploitation of competitive advantage, etc. (Grant, 2005). Military strategy drives the achievement of governmental policy goals, which is set at the national strategic level (Melvin, 2010: 7) and departmental goals set at the strategic level. The relationship between the different levels of strategy from the perspective of national security, the military being an important contributor, is depicted in Figure 2.13 above, adapted from Melvin (2010). Policy typically follows the same logic. Liddell Hart's understanding of military strategy is that it is the art of military distribution and application to attain policy objectives (Melvin, 2010: 6).

To practice this art successfully the strategist requires much knowledge (or IC) as well as have access to relevant knowledge (time value of knowledge argument), with a high refresh rate (constant new knowledge that informs new meaning and understanding). This underlines the importance of KM and for most, a clear understanding of organisational specific knowledge (i.e. organisations should clearly define what is understood as knowledge or coherence). For this reason, the researcher delved into SA DOD policy to ascertain what is understood as knowledge and how this is managed by the SA DOD (dissertation Chapters 5 and 6).

The KM strategist, embodied in the CKO, is instrumental to establish coherence and integration of organisational knowledge and KM both in KM and organisational strategy. This can only be achieved with a vivid understanding of the strategic environment and the organisational IC available. If achieved, strategic fit is the result; with advantage for the taking. Depending on the requirement that is dictated by both internal and external environmental factors, strategies can be static or very flexible. The researcher supports KM strategies that are flexible and adaptive conforming to the dynamic nature of knowledge and the complexity of business and military environments. Beinhocker (1999) provides views on robust adaptive strategies, drawing on arguments raised by Brown and Eisenhardt (1998). These writers regard flexibility and adaptiveness as very important to strategy execution in complex environments. Therefore, with complexity in mind, KM strategies for militaries should be flexible and adaptive.

Musimwa-Makani (2012: 25) citing Malhotra (2000) and Allee (2003) – the conversion of tacit knowledge into explicit knowledge seems to be very complex and *ipso facto* the understanding of complexity theory being a requirement. Axelrod and Cohen (2000) and Caldart and Ricart (2004) write on the impact of complexity on organisations. Complexity is typically a by-product of huge volumes of data, information and knowledge or results in the enormous volumes of data, information and knowledge requiring further processing to enable decisions, actions, effects and advantage. Brown and Eisenhardt (1998) argue that there is a fine line between chaos and bureaucracy and that this line can be managed with the right amount of organisational complexity. In order to compete, organisations must adopt the appropriate level of adaptiveness within organisational structure and process to eliminate organisational paralysis due to excessive- or inadequate structuring, that is, choose the right amount of complexity that facilitate knowledge flow. Complexity plays an important part in structuring the organisation correctly to have knowledge flow to improve productivity, performance, advantage and overall synergy. Strategy in all business/military areas is the vehicle with which to attain flexibility and adaptiveness. Let us now consider the impact of organisation structure on the implementation of KM.

2.6.4.5 Organisational Structure

Strategy execution is dependent on an organisational structure. An organisational structure is essentially the architecture of organisations designed around vision, strategy, leadership, control, functionality and the environment. It should be constructed to unlock advantage.

Organisational structure characteristics that facilitate or enhance KM are those that -"… encourage team spirit at work and increase exchange of the ideas with low degree of formalization and a decentralization of the decision making process" according to Zheng, Yang and McLean (2010) and Gold, Malhotra and Segars (2001) in Hassan and AL-Hakim (2011: 96) and several references cited in Yadav and Singh (2013). Yadav and Singh (2013) and Claver-Cortés, Zaragoza-Sáez and Ortega (2007) in Hassan and AL-Hakim (2011) support the view that KM initiatives require flexible organisational structuring. This follows the logic discussed above on the management of complexity and knowledge flow. This points to why KM is difficult to implement in bureaucratic organisations.

Hasanali (2002), Chen and Huang (2007) and Yadav and Singh (2013) support the division of organisational structure into elements that reinforce formalisation, those that reinforce decentralisation and yet others that enhance integration. They conclude that KM processes greatly enhance total organisational integration (or at least strive to achieve this). Also, bureaucratic characteristics such as centralisation and formalisation (typically found in public service organisations) do not enhance KM processes such as knowledge creation and flow. Thus, the organisational structure must support all KM CSFs in an integrated manner.

Structure implies a degree of integration amongst the structural components. Integrated KM (i.e. integrating knowledge processes and business processes) is identified as a key driver of innovation, sustainability and efficiency.[47] Grant (1996a) is of the opinion that competitive advantage is unlocked through integrated KM and not just the presence of knowledge. Grant (1996a) proposes a Knowledge-based Theory of an organisation (discussed later in the dissertation). This is grounded in the idea of knowledge integration as the centre of organisational capability building. Seemann, *et al*. (2000: 6) proposes that IC integration (i.e. human-, structural- and social/relational capital) is fundamental to knowledge creation and KM.

Riempp and Smolnik (2007: 4) state that KM integration stems from the activities or levers used to achieve required solutions. One of the most important KM levers is exchange or transfer of knowledge between individuals (this process is also central to the SECI model for knowledge creation). This exchange of information has a direct impact on what Riempp and Smolnik (2007) proposed as the primary levers for integrated KM, which in their opinion are content, competence, collaboration and culture. The dissertation discusses this model later. The model highlights the importance of integration.

Al-Alawi, Al-Marzooqi and Mohammed (2007) in Hassan and AL-Hakim (2011: 96) state that an -"… organizational structure characterized by participative decision making, ease of information flow and cross-functional teams contribute positively to support knowledge sharing.". These characteristics all point to a particular style of leadership as well as business process

[47] Grant, 1996a; Alavi and Leidner, 2001; Riempp and Smolnik, 2007; Lee, Tsai and Amjadi, 2012.

integration. These characteristics should be incorporated into organisational structure design in order to facilitate and/or enhance KM performance. They also require a certain organisational culture without which the structural design will probably follow mechanistic design principles resulting in bureaucracies with low levels of flexibility, adaptability, responsiveness that will hamper the ability to innovate (or generate new knowledge). Let us now consider measurement as a KM CSF.

2.6.4.6 Measurement

To measure is to know. This statement is based on the opinion of Lord Kelvin (1883) –

> "I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of Science, whatever the matter may be." (Wood, 2015: online).

Measuring knowledge is close to the objectivist approach to KM. To be frank, to measure knowledge is very difficult, especially if it is tacit. However, from an organisational performance perspective, two dimensions (at least) need measuring, namely how KM affects organisational performance and how KM is performing (Holsapple & Joshi, 2000 and Hasanali, 2002) within the context of knowledge resources valuation (human, knowledge, material and finance) and processors (human and technological) (Holsapple & Joshi, 2000). Črnjar and Dlačić (2014) also identified a requirement for KM success measurement indicators. Thus, measurement will assist the organisation to plot the course, monitor, adjust or initiate action in each KM CSF to attain better KM effects and overall organisational performance.

Some KM models include measurement as a distinct part. The Inukshuk KM model (Girard, 2004) is one such model (see KM models later in the dissertation). In the following section resource influences on the successful implementation of KM in organisations are discussed. Human resources and IT are two distinct resources that enable KM.

2.6.4.7 Human Resource Management

Črnjar and Dlačić (2014) view HRM as the most important KM CSF. Why? Knowledge is about people. Yadav and Singh (2013: 196) referencing a number of writers - summarise their opinion as - "People are at the core of creating organizational knowledge". Because knowledge is inherent in people, the management of people and KM are Siamese twins. Teece (2000) in Kakabadse, *et al*. (2003: 87) states that "Managing knowledge is not the same as managing human resources – it is more multi-faceted than simply managing people; it also involves managing intellectual property rights and the development and transfer of individual and organizational know-how".

People are also the leaders of KM. In fact, every part of IC is created, influenced or used by people. Even KM enablers such as IT is created and used by people.

Tiwana (2000) in Zaim, Tatoglu and Zaim (2007) and several other writers recognise people as human capital (as part of the IC construct). Hassan and AL-Hakim (2011: 95) refer to an article

written by Chen and Huang (2009) stating - "HRM practices are essential to capture and support employee's knowledge and skills [human capital] that an organisation needs". HRM is a strategic organisational activity to harness human capacity (Svetlik & Stravrou-Costea, 2007 and Hassan & AL-Hakim, 2011). This is in agreement with the earlier conclusion in the dissertation, that people are a critical (if not pivotal) component in understanding both knowledge and the management thereof.

Wiig (1999b) is of the opinion that KM is important to be able to deal with how people in the organisation think. BenMoussa (2009) states that the motivation of people to participate in KM activities (such as sharing knowledge) is critical, but challenging (Yadav & Sing, 2013), before even considering IT solutions. It is for this reason that particular styles of leadership (as discussed above) are KM CSF.

A barrier to KM when considering the management of people is that of knowledge sharing – without which knowledge conversion and generation are inhibited (Hassan & AL-Hakim, 2011). Knowledge usually starts with individuals and after a conversion process (suggested by the SECI knowledge conversion model) ends with individuals before a new conversion cycle begins. The availability and use of IT, organisational culture, leadership, strategy and structure play an important part in this conversion process, *ipso facto,* the requirement for coherent and integrated KM. Let us now consider the relationship between finance and KM.

2.6.4.8 Knowledge Management and Finance

As with any other business requirement, funding is always required. From a KM perspective - "Firms are increasingly investing in [IC], but the process of deciding where and how to invest remains relatively undisciplined, resulting in disappointing returns and wasted resources." Seemann, *et al*. (2000: 9). This was probably one of the situations during the period of 'peak of inflated expectations (mid- to late 1990s) and trough of disillusionment (early 2000s) as posited by Riempp and Smolnik (2007: 3)

Thus, funding the correct initiatives is paramount for KM success. Such funding needs careful management to ensure no leakages occur to the broader organisation when financial resources become constricted. KM funding can be managed centralised by the CKO or distributed by various business component managers. Centralised funding of a KMC is the preferred option to ensure no syphoning occurs. Also, to ensure KM funding does not become the organisational purse for IT requirements.

2.6.4.9 Knowledge Management Systems and Information Technology

Based on the discussion earlier outlining the definitional issues differentiating information and knowledge and the fact that these two concepts are used interchangeably; thát disagreement permeates the development and application of what is known as KMS and IT. KMS are posited as IT that is employed to - "… systematize, enhance and expedite intra and inter firm [*sic*] knowledge management (Alavi and Leidner, 1999)" (Halawi, *et al*., 2005: 77).

Knowledge management systems refer to a class of information systems applied to managing organizational knowledge. Knowledge management systems are invariably IT-based systems

developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer and application (Alavi and Leidner, 2001). Knowledge management systems address both the past and the future since they focus on problem-solving, they support both tacit and explicit knowledge, they should support both objective and subjective aspects, they are highly dependent on Internet-based technologies, and they enable the sharing of knowledge throughout the organization (Wickramasinghe, 2003).

Knowledge management systems are categorised as integrative instruments, interactive instruments, integrative systems and interactive systems (Zhang, 2013: 24), explained as follows based on the work of Maier and Remus (2002) -

Table 2.8: Knowledge Management System and Information Technology

Integrative instruments	Best practices, lessons learned, and content management, etc.
Interactive instruments	Yellow pages, expert networks, skills directories, and communities, etc.
Integrative systems	Knowledge repositories, meta-search systems, knowledge discovery and mapping, etc.
Interactive systems	Collaboration, knowledge transfer and e-learning push-oriented systems, community builders, etc.

Adapted from Zhang (2013: 24).

"Advances in information and communication technologies (ICT) allow knowledge-based systems to utilize the tacit and explicit knowledge within an organization and afford greater possibilities for individuals and organizations to create and to share that knowledge [Alavi & Leidner, 2001 and Schwen, *et al*., 1998)]." (Zhang, 2013: 24). It is widely recognised[48] that IT enables IM and subsequently KM, primarily through the use of computing applications, databases, decision-support systems, information security and other instruments, applied in a balanced manner (Zhang, 2013; Yadav & Singh, 2013; Črnjar & Dlačić, 2014) to make explicit knowledge accessible. These are typically integrative systems with interaction in mind. Many authors[49] support the position that the use of IT enables KM primarily because of its integrative and interactive (e.g. facilitating SECI) capabilities mentioned above. Many organisations, however, place too much emphasis on IT, to the point that IT is professed to be KM. Schwab (2016: online) states -

> "… governments will gain new technological powers to increase their control over populations, based on pervasive surveillance systems and the ability to control digital infrastructure. On the whole, however, governments will increasingly face pressure to change their current approach to public engagement and policymaking, as their central role of conducting policy diminishes owing to new sources of competition and the redistribution and decentralization of power that new technologies make possible.".

Thus, although new technology, typically in the form of IT, enables control – these technologies also erodes interaction with people which is central to KM. Mortensen (2014: 3) states

[48] Thierauf, 1999; Hasanali, 2002; La Grange, 2006; Lytras & Pouloudi, 2006; Onyancha & Ochola, 2006; Raghu & Vinze, 2007; Zaim, Tatoglu & Zaim, 2007; BenMoussa, 2009; Hassan & AL-Hakim, 2011, Zhang, 2013.
[49] Davenport and Prusak, 1998 and Binney, 2001 in Zaim, Tatoglu & Zaim, 2007; BenMoussa, 2009; Črnjar & Dlačić, 2014.

– "Knowledge Management is a people-centric process; the technical systems enable the Knowledge Management process, but cannot be the focus of it".

Seemann, *et al*. (2000: 5 and 9) states that management invests vigorously in IT in the hope that it will result in enhanced structural capital and knowledge sharing, and thus sell IT as KM. "[O]ur research has shown that executives often invest in information technology hoping that by creating structural capital people will share knowledge. But the only result is many databases that no one uses." Seemann, *et al*., (2000: 9). A common example of this is the misguided assumption that merely implementing shared databases or document repositories will enhance the creation and/or use of knowledge. A clear failure of the objectivist approach to KM.

In fact, BenMoussa (2009) is of the opinion that the over-emphasis of IT usage makes IT a barrier to an effective KMS. Hasanali (2002: 3) summarises this misperception very eloquently – "A KM initiative is not a software application; having a platform to share information and to communicate is only part of a KM initiative.". BenMoussa (2009) articulates this CSF further by stating that KMS must be integrated with every aspect of the organisation (especially across all IC components – Seemann, *et al*., 2000) in order to be effective.

No matter what your particular disposition is towards the use of IT – IT and the use thereof is not KM. Information technology is, however, a critical KM enabler in the current business environment, enabling decision-making, knowledge conversion and sharing. In the military, IT accelerate the application of what is known as Boyd's OODA loop (Figure 2.14 and 6.4) - thus providing decision-makers (corporate and operations) with first mover advantage. Modern-day computing and related technology greatly enhance the reaction and decision cycles. Several references are made to the OODA loop throughout this dissertation and are developed into further graphics that integrate the knowledge continuum, the OODA loop and time.

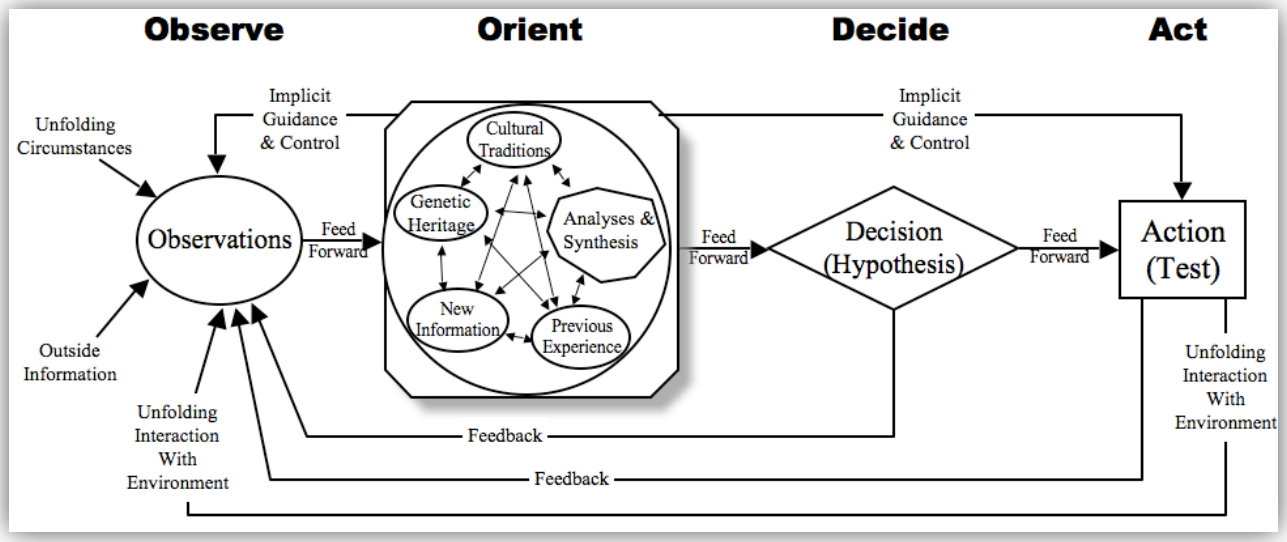


Figure 2.14: Boyd's OODA Loop

Source: Tremblay (2015: 7).

Hasanali (2002: 3) lists common IT platforms (which support process integration), simple technology (in order to make the use of enablers less complex) and adequate training (supporting

knowledge sharing and the construction of vocabularies and networks) as some of the critical elements to the success of IT enablers.

The use of the label 'KM system' (also defined earlier in the dissertation based on the work of Kucza (2001) is the stumbling block. As soon as the word 'system' comes into play organisations tend to think and understand 'IT' or 'ICT'. Thus, the researcher proposes that organisations should rather use the label 'knowledge management capability' (or KMC) when referring to a KMS. This construct is much broader in its application and not just technology based. Information technology and related systems will always be a part of the organisational architecture and are designed for a specific purpose – to process and manage data, information and knowledge. To try and distinguish between IT and KMS is perilous because of the nature of the constructs (information and knowledge) and because knowledge is dynamic and the product of a continuum rather than a hierarchy. A KMC includes all the aspects discussed above as KM CSFs in an integrated manner. The researcher is for this reason in favour of the establishment of an SA DOD KMC rather than a KMS.

From a military perspective – the USA Army states as a priority task related to their KM initiatives – "Capitalize on Knowledge Management capability to generate collaboration and teamwork that promotes shared understanding of Commander intent, reduces decision making complexity and provides best in class customer service." (Weeks, 2016: slide 4). This confirms the contention by the researcher that the preferred way forward is a KMC. Appendix A provides an extended list of academic support for the various KM infrastructure CSF. These are considered fundamentals for successful KM.

The following sections will take a closer look at KM models that incorporate many of the aspects discussed above. The discussion on KM models provides the constructs that inform the proposed KM model for the SA DOD. With respect to SRQ 4 – *a KM model for the SA DOD*; the KM model proposed by the researcher in chapter 8 of the dissertation is a descriptive model (i.e. describing the broad framework applicable to KM for the SA DOD) but specifically designed for the SA DOD environment. A broader application could possibly be achieved through adaptation of the model to include, for example, specific external stakeholders.

2.7 KNOWLEDGE MANAGEMENT MODELS

There are several existing KM models, described by or summarised by as many writers. Some of these are: Knowledge Management Pillars (Wiig, 1993); Socialisation, Externalisation, Combination and Internalisation model for knowledge creation (Nonaka, 1994; and Nonaka & Takeuchi, 1995); Core Capabilities and Knowledge Building (Leonard-Barton, 1995); Model of Organizational Knowledge Management (Andersen (1995); Model of Knowledge Transfer (Szulanski, 1996); Model of Intellectual Capital (Petrash, 1996); Framework of the Knowing Organization (Choo, 1996); Framework of Intangible Assets (Sveiby, 1997); Knowledge Value Chain (Weggeman, 1997); Model of Knowledge Management Process (KPMG Peat Marwick, 1997); Framework of Knowledge Management Stages (Van der Spek & Spijkervet (1997); 'ba' concept (Nonaka and Konno, 1998); Knowledge Management Strategy Focus Areas (Wiig, 1999b); Conceptual Knowledge Management Model (Uit Beijerse, 1999); KM Lifecycle (Nissen, Kamel & Sengupta, 2000: online) and adapted by Jung, Choi and Song (2006); Philosophy-based model,

Cognitive model, Network model, Community model and Quantum model - meta-models for KM (Kakabadse, *et al.*, 2003: 80-85); Inukshuk Knowledge Management Model (Girard, 2004); Intellectual Capital Structural Model (Alwert, Bornemann,& Kivikas, 2004); Knowledge Management Solution Model (Becerra-Fernandez, Gonzales & Sabherwal, 2004); Time value of knowledge (Hall, *et al.*, 2007) and KM Architecture (Riempp & Smolnik, 2007).

General application and/or specific application inform KM models/frameworks development. Widely acknowledged KM theories/models relate to knowledge creation, the management of knowledge, the integration of knowledge, the time value of knowledge and others. Knowledge management models could be divided into typically descriptive models (broadly or specifically) and prescriptive models – according to Holsapple and Joshi (1999: 1). These very broad categories can be further subdivided into - "… intellectual capital models, knowledge category models and socially constructed models for the KM process" (McAdam & McCreedy, 1999 in McAdam & Reid, 2000: 317). It is quite evident how an understanding of the requirements of KM expanded over time when reviewing the models.

The aim of this dissertation is not to review every possible KM model in detail because the models are context driven. Let us consider some of the KM models and frameworks proposed by various academics and writers. These models are widely cited in academic research and thus most likely influence organisational thinking about KM more often than not. They also provide a wide variety of perspectives of what a KM model is considered to be, covering models that were designed for both the private and the public sector and models that are very simplistic in their approach to KM to models that are providing some form of integration with other organisational components.

2.7.1 Socialisation, Externalisation, Combination and Internalisation Model for Knowledge Creation

A discussion about KM will probably not be complete without considering the Socialisation, Externalisation, Combination and Internalisation (SECI) model, in short, SECI. SECI is about the creation of knowledge. It is thus about possibly the most important process in any organisation, private or public. The SECI knowledge creation model is based on the dichotomy between explicit and tacit types of knowledge (Holsapple & Joshi, 1999). SECI is the brainchild of Nonaka and Takeuchi (1995) and is accepted KM theory[50]. SECI forms part of the - "… socially constructed models for the KM process" (McAdam and Reid, 2000: 317). SECI postulates knowledge creation as a dynamic process that leads to innovation (Nonaka & Takeuchi, 1995).

Table 2.9: SECI Knowledge Creation Model

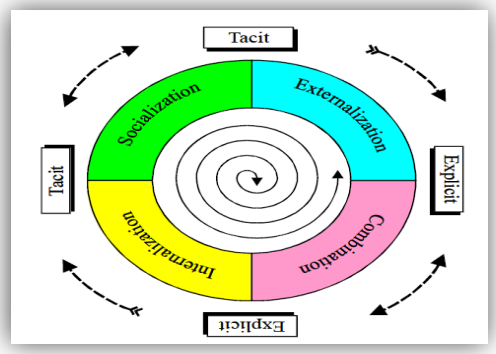
Component	Process	Examples
Socialisation "… a process of creating knowledge by converting tacit knowledge from one entity		- Conversation (social and purposeful) - Relationship forming (social, mentorship, supervisory) - Imitating people

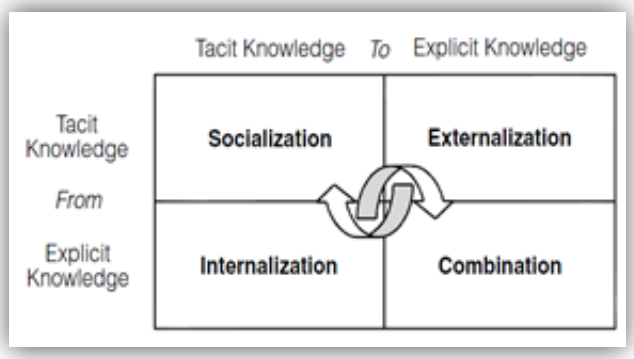
[50] Polanyi, 1966a; Uit Beijerse, 1999; Kucza, 2001; McIntyre, Gauvin & Waruszynski, 2003; Baqir & Kathawala, 2004; Girard, 2004; Riempp & Smolnik, 2007; Girard & McIntyre, 2010, De Nadae & Monteiro de Carvalho, 2017 - and many more.

(individual, group, or organization) to another entity.".	Human (technology and media enabled) interaction, the willingness to share, the ability to learn and the drive to innovate.	- Practising - Training
Externalisation "…conversion of tacit knowledge into explicit knowledge".		Through the type of conversation and the choice of language (metaphors, analogies, hypotheses and models).
Combination "…a process of creating new explicit knowledge from existing explicit knowledge.".		Manifested in the documentation, recordings, video, software, social media, meetings, telephone, etc. after the restructuring of existing data and information through processes of categorisation, addition, combination and synthesis.
Internalisation "…conversion of explicit knowledge into tacit knowledge".		Understanding and learning.

Adapted from Nonaka and Takeuchi (1995), Uit Beijerse (1999) and Holsapple and Joshi (1999: 3).

SECI proposes that tacit and explicit knowledge (both of scientific- and social origin - McAdam & Reid, 2000: 317) interact as facilitated by social processes such as verbal communication and writing to create new understanding and *ipso facto* new knowledge in a cyclical and dynamic manner. Three different representations of the SECI model are depicted in Figure 2.15. The components of the SECI model, described briefly, are as follows by the depictions of various academics –





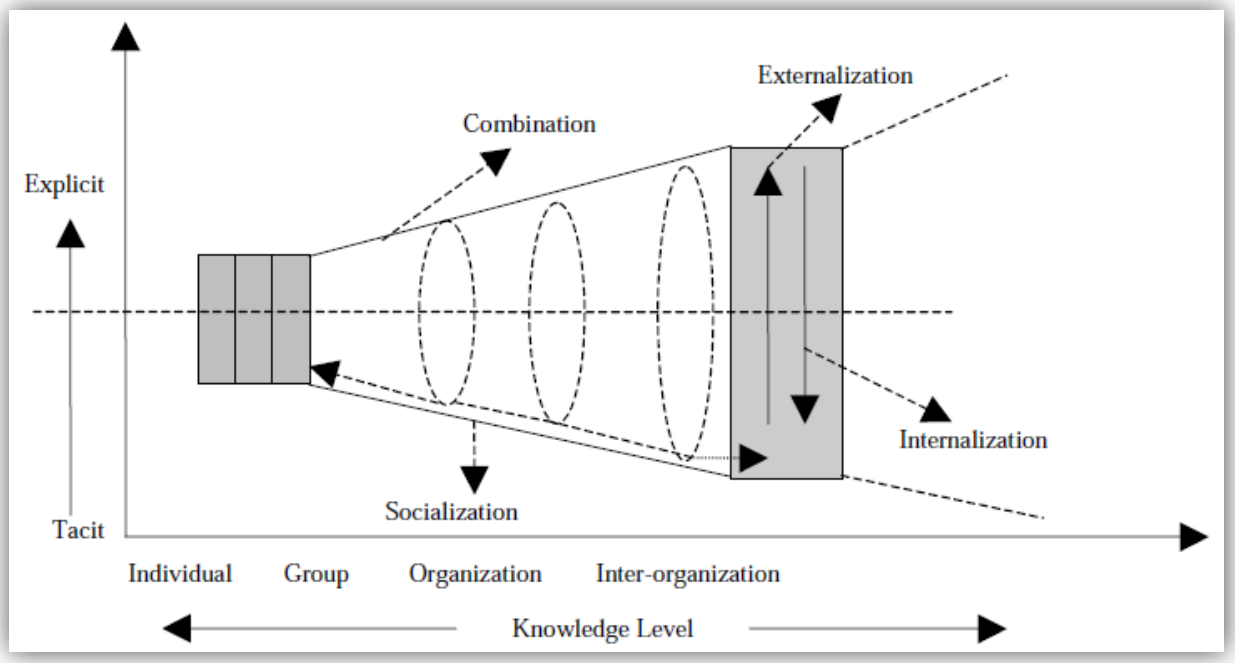


Figure 2.15: The SECI Knowledge Creation Model (three different graphic depictions)

Source: Girard & McIntyre (2010: 75) and McIntyre, Gauvin, Waruszynski (2003: 36) and Holsapple & Joshi (1999: 11).

SECI is not KM. SECI is a collection of knowledge processes that need consideration when constructing a KMC. More specifically, SECI allows understanding of the underlying processes that facilitate knowledge flow and sharing in organisations. The dynamic nature of knowledge, as discussed earlier in the dissertation, directly influences knowledge sharing and the ability to dynamically transform knowledge. SECI distinctly recognises people (processes of the human mind and actions by people to create explicit knowledge) as well as technology (artefacts, enabling tools, processes and spaces or 'ba') in the creation of knowledge and also hint at possible avenues for KM. SECI requires appropriate organisational leadership, structures, culture and IT to facilitate knowledge processes such as flow and access. The knowledge creation process, whether it is SECI or any other, in the researcher's opinion is not KM but an important KM process(es) to be considered when constructing a KMC. Organisations have to understand who the primary knowledge creation agents are and which knowledge processes are available for the construction of knowledge 'ba' and KMCs. Organisations are in danger of not harnessing possibly the most important part of their knowledge portfolio with which to assure survival/relevance/competitiveness if they do not recognise the importance of people as the ultimate repository of knowledge. SECI does exactly this. SECI is a simple model that describes the dynamics of normal social and organisational reality for the creation of organisational knowledge. It is important for this research due to its general acceptance as a knowledge creation model from a processes perspective and because the SA DOD employ both people and technology and function in a complex and dynamic environment that requires all four SECI process components. Even the USA Army subscribe to SECI, see Figure 2.16 –

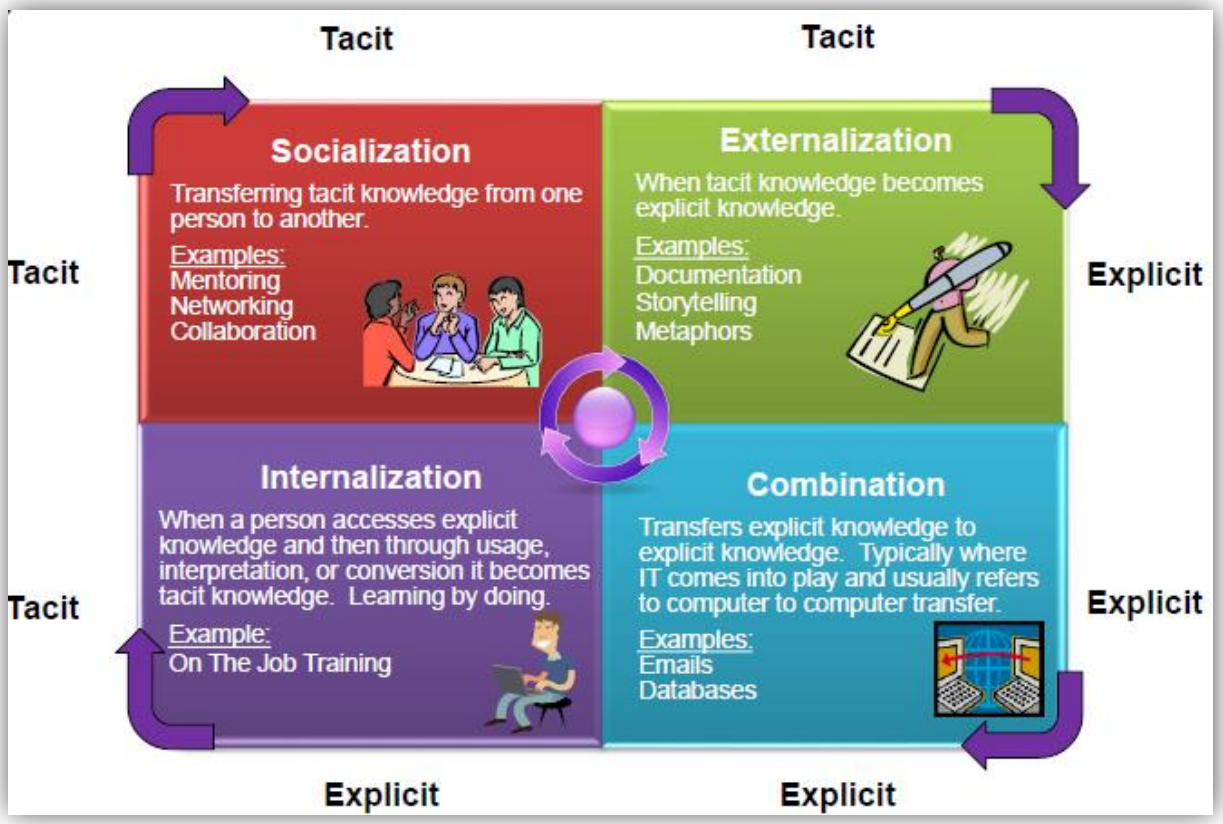


Figure 2.16: The SECI knowledge Creation Model (USA Army)

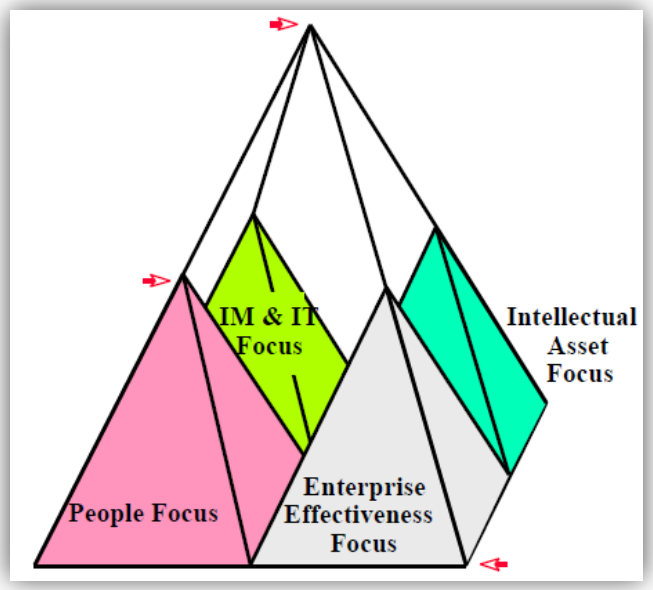
Source: Weeks (2016: slide 14).

Human (media enabled) interaction and communication are essential for military command and control (C2) and organisational learning; the willingness to share knowledge is vital for learning and continuity of capabilities; the ability to learn and the drive to innovate are crucial for the SA DOD in order not to stagnate in a very complex and ever-changing globalised world. However, SECI cannot be accepted (wholesale) as an organisational KMC because it does not address IC integration, organisational structure, culture, security and measurement, KM strategy, finance and IT. It is just a process model for consideration in organisational KMC.

Central to knowledge creation is space or location within which it is achieved. The 'ba' construct, proposed by Nonaka and Konno (1998) is important due to the fact that the SA DOD creates and manages knowledge in specifically mandated spaces. It is these spaces that Nonaka and Konno (1998) conceptualise as 'ba'. It basically provides the element of context to information that facilitates conversion to knowledge (Nonaka, Toyama & Konno, 2000 and Baqir & Kathawala, 2004). For the SA DOD, these spaces enable specific military-related contextualisation and *ipso facto* military knowledge creation *ala* SECI. The spaces also facilitate a particular type of leadership as proposed by the Inukshuk KM model discussed later. Nonaka, *et al*. (2000) clearly links SECI, 'ba' and leadership as KM CSF. In the Riempp and Smolnik (2007) model (discussed later in the dissertation) these are addressed in the strategy and management layer, structure/layout layer, and KM processes layer of their KM model.

Contextualising information also relates to the notion proposed by Polanyi (1966b) that knowledge becomes personalised or in the case of the SA DOD – departmentalised or

institutionalised. Thus, SECI differs from organisation to organisation because of the organisational and environmental dynamics stemming from its reason for existence, funding model, organisational culture, the involvement of leadership, strategic nature of the organisational knowledge, complexity and many more variables.



'Ba' can also be further extended into the virtual realm where cyberspace provides some unique and very useful spaces to create knowledge (Baqir & Kathawala, 2004). This is addressed in the Riempp and Smolnic (2007) model in the application layer. 'Ba' has a distinct impact on the integration of KM due to the information systems requirements (enablers), geography and organisational architecture (location and space) and personal willingness to share (work ethic and culture). A clear understanding of the spaces to be integrated is thus critical for KM. The SA DOD, in many instances, is hampered by the sheer variety of spaces that have to be integrated and security requirements, resulting in dislocation rather than integration. The establishment of an SA DOD KMC reaches far into the abyss to resolve some of these issues.

2.7.2 Knowledge Management Strategy Focus Areas

The graphical depiction of the KM strategy focus areas by Wiig (1999b: 4) is not a KM model *per se* but does assist with identifying the key elements for KM success. Wiig separates people and intellectual assets, which are in line with tacit and explicit knowledge and human capital and structural capital of IC (refer to earlier discussions about IC and Figure 2.17 below). Other models that provide this focus is the Riempp and Smolnik (2007) and Girard and McIntyre (2010) KM models.

The pyramid form of the Wiig-model is specifically useful construct because it depicts building towards a possible future or vision or goal. Considering the Wiig (1993) KM Pillar model, Wiig published the KM Strategic Focus Areas model a number of years later, as depicted in Figure 2.17.

Figure 2.17: Knowledge Management Strategy Focus Areas

Source: Wiig (1999b: 4).

However, the KM Strategy Focus Areas model is not descriptive enough to be used as a management tool without a detailed explanatory narrative or strategy document at hand. The void space at the top of the pyramid can be filled in with the other KM CSFs. From Alwert, Bornemann and Kivikas (2004) in Zhang (2013: 23) the intellectual asset focus area can be expanded to view how it interacts with organisational strategy.

2.7.3 KPMG Knowledge Management Process Model

The KM Process model provides a description of what is perceived primary KM processes (acquisition, indexing, filtering, linking, distribution, and application) which are posited as sequential with no feedback loops for correction and adaptation to remain relevant in complex and changing environments. This is depicted in Figure 2.18.

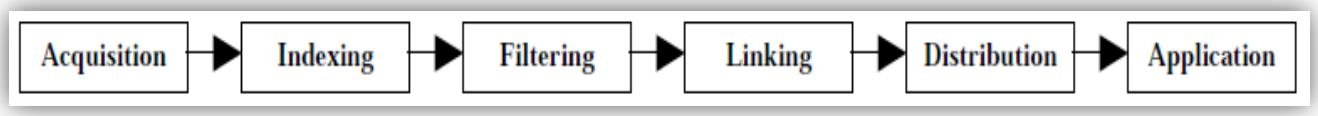


Figure 2.18: The KPMG Knowledge Management Process Model

Source: Holsapple & Joshi (1999: 11).

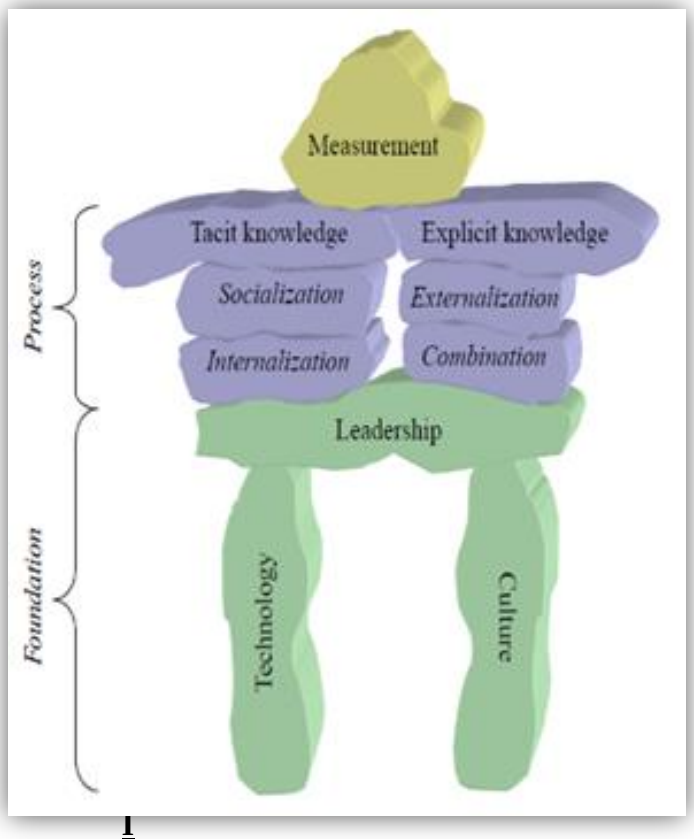
This makes the model very inflexible. Also, the model does not provide for knowledge creation (semantically probably included in knowledge acquisition) or security and measurement. The following description of the model is provided by Holsapple and Joshi (1999: 4) -

> "Acquisition refers to knowledge creation and content development. This is accomplished by distilling experiences and lessons learned from client engagement projects, by collecting, synthesizing, and interpreting a variety of information. The next three phases (indexing, filtering, and linking) are referred to as library management activities and include the screening, classification, cataloging [*sic*], integrating, and interconnecting of content from both internal and external sources. The distribution phase includes packaging and delivery of knowledge in the form of Web pages (e.g., designing knowledge displays, templates, and graphics; creation of multimedia formats). Application refers to using the knowledge that has been collected, captured, and delivered to produce products and services.".

The distribution phase is very restrictive if it is just web-based. The language used to describe the distribution also reeks of objectivism. Any form of communication is a form of knowledge distribution or sharing. Also, knowledge security is not mentioned. It is also very disappointing to have the application of knowledge only linked to services and products rather than effects and advantage.

2.7.4 The Inukshuk Knowledge Management Model

The Inukshuk KM model remains important for this research because of its empirical relevance to public organisations. The Inukshuk KM model is depicted in Figure 2.19. The Inukshuk KM model[51] integrates concepts of technology, culture, leadership, knowledge creation (based on Nonaka's Socialization, Externalisation, Combination and Internalization [SECI] model) and measurement (Girard, 2004 and 2005). This model showed some initial usefulness to apply to the SA DOD environment, primarily because of the recognition of measurement (relating directly to good governance and transparency within public service) and culture (not just organisation culture but different cultures in general, of which South Africa has a rich endowment). Many of the aspects named above have been tested in research by Kruger and Johnson (2009) specifically for the South African environment. The model succeeds in combining some KM CSFs and processes. However, an immediate criticism of the model is that several KM CSFs (e.g. strategy, structure, HRM) are not mentioned. No mention is made of security, a critical factor for militaries.Other criticism is the depiction of technology as one of the legs of the Inukshuk, which might give the impression that technology (or typically IT) is the foundation of KM. Information technology is, as discussed earlier, just an enabler for KM. Also, the graphic representation provides no clues as to how integration will be achieved between these elements. A better depiction would have to change technology and leadership around.



I
n
ukshuk Model

Source: Girard & McIntyre (2010: 73).

[51] Girard and McIntyre (2010) write about KM modelling in public sector organisations. They use a case study methodology, building on the theoretical base of previous writers and researchers, endeavouring to demonstrates the value of KM modelling in a Canadian public service science-based initiative. It is posited as a holistic approach to KM in the public sector.

2.7.5 Intellectual Capital Statement Structure Model

As discussed earlier in the dissertation, the Intellectual Capital Statement Structural Model provides a glimpse of the importance of IC as an organisational resource as well as conceptualises IC interaction with both business and KM processes in order to reach business objectives. There is also feedback loops for correction, adaptation and learning.

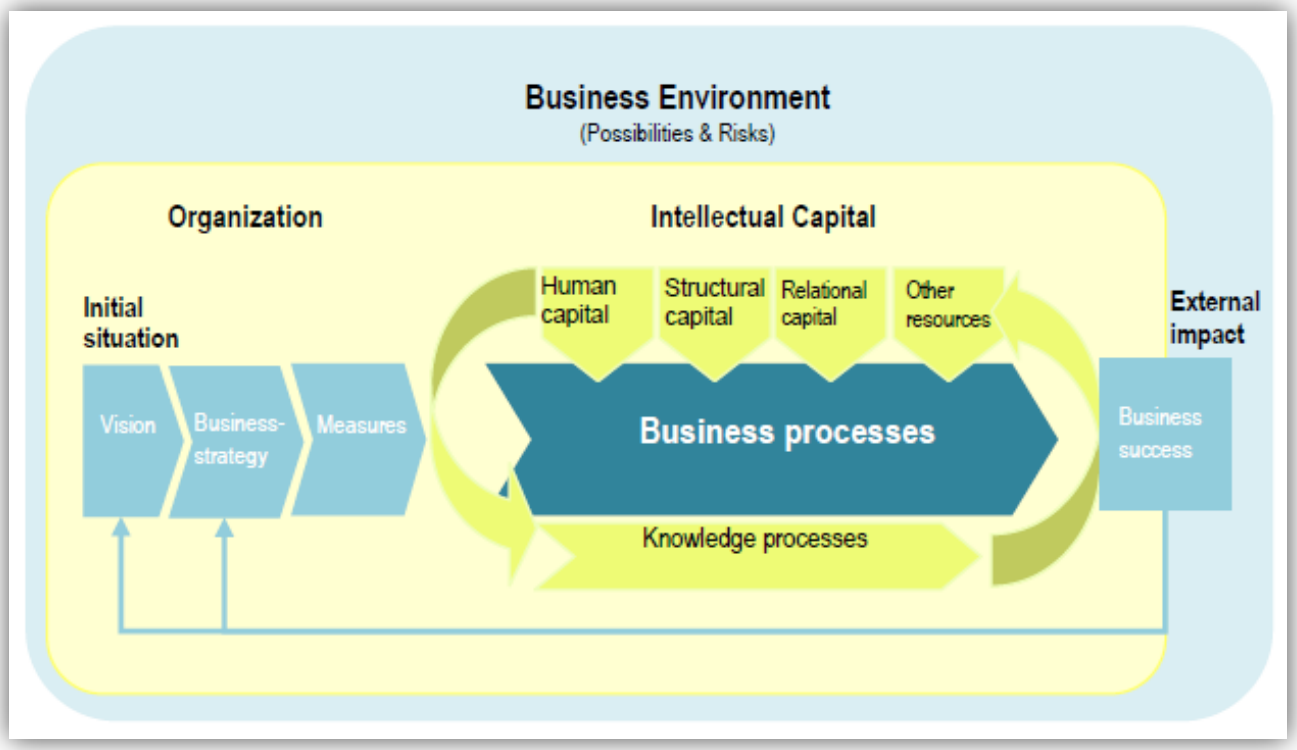


Figure 2.20: Intellectual Capital Statement Structural Model

Source: Alwert, *et al*. (2004) in Zhang (2013: 23).

The IC Statement Structural Model for KM in figure 4 is a practical example of how IC could be incorporated into organisational processes, depicting the perpetual influence of IC on business and knowledge processes. What is also important is that the model recognises the importance of strategy in the management of knowledge. From a military perspective, the only aspect that is really different is the organisational objectives and external impact due to the use of different IC and possibly different business and KM processes. The conceptual links between the different components of the model are generic enough to be applied to or adapted for the military environment, as depicted in Figure 2.20.

2.7.6 Organisational Knowledge Management Model

A key contribution of the Andersen and APQC[52] (1996) model labels KM CSFs (leadership, culture, technology and measurement) as enablers, which is not the same as organisational factors critical to the success of organisations. The theory and application thus far discussed identify these as KM CSFs. It also does not provide a sense of required integration between these CSFs. The

[52] American Productivity and Quality Center.

Organisational Knowledge Management model only name a number of KM processes (share, create, identify, collect, adapt, organise and apply), much the same as the KPMG model above. No mention is made of a KM vision, strategy, knowledge security and measurement. The model is very 'flat' in the sense that it does not provide an indication of the relative importance or sequence of the various components or a sense dynamics, as depicted in Figure 2.21. It is, in essence, a one dimensional Inuckshuk KM model. The Organisational KM model is very similar to the Inukshuk model in Figure 2.19. However, the Inukshuk model only focuses on SECI with the Organisational KM model expanding on possible KM processes.

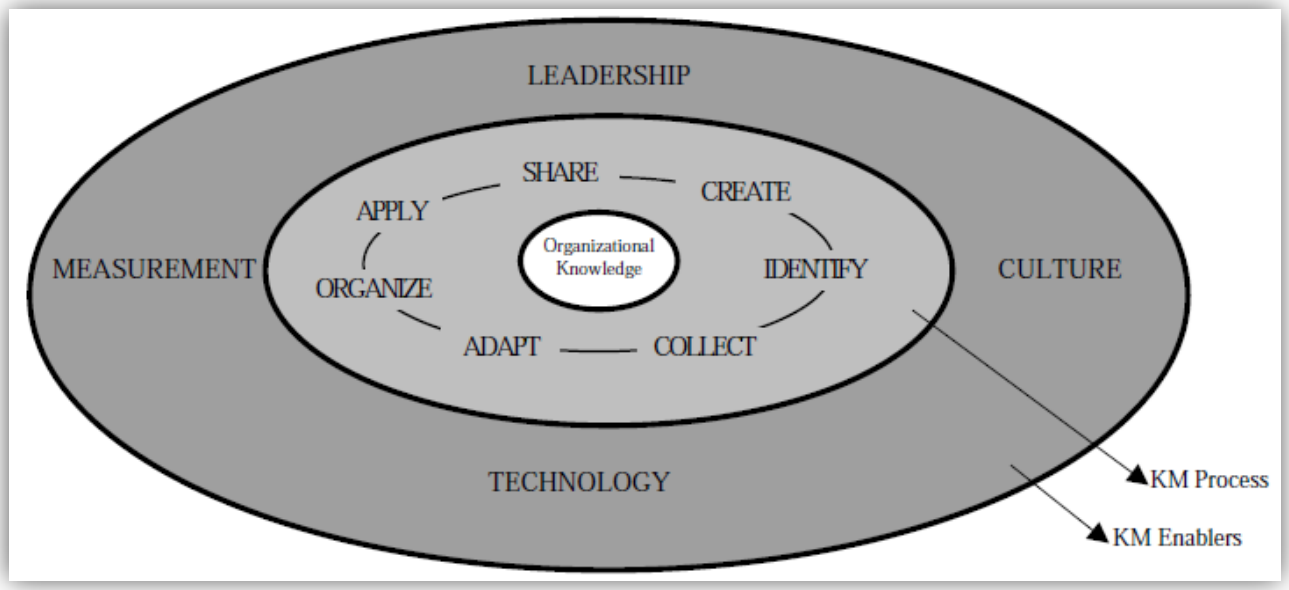


Figure 2.21: The Organisational Knowledge Management Model

Source: Holsapple & Joshi (1999: 9).

2.7.7 Building Blocks of Knowledge Management

The KM Building Blocks model (Probst, 1998) is essentially a KM process model with very little reference to the rest of the organisation, as depicted in Figure 2.22. The model does, however, mention objectives (input) and measurement (output) as two distinct factors outside of the KM processes and mentioned by some of the models discussed above. The model does provide some indication that the KM processes do not necessarily follow a sequence but influence each other in a random manner. It thus has more utility than the KPMG KM model which is completely linear. No mention is made of the requirement for security.

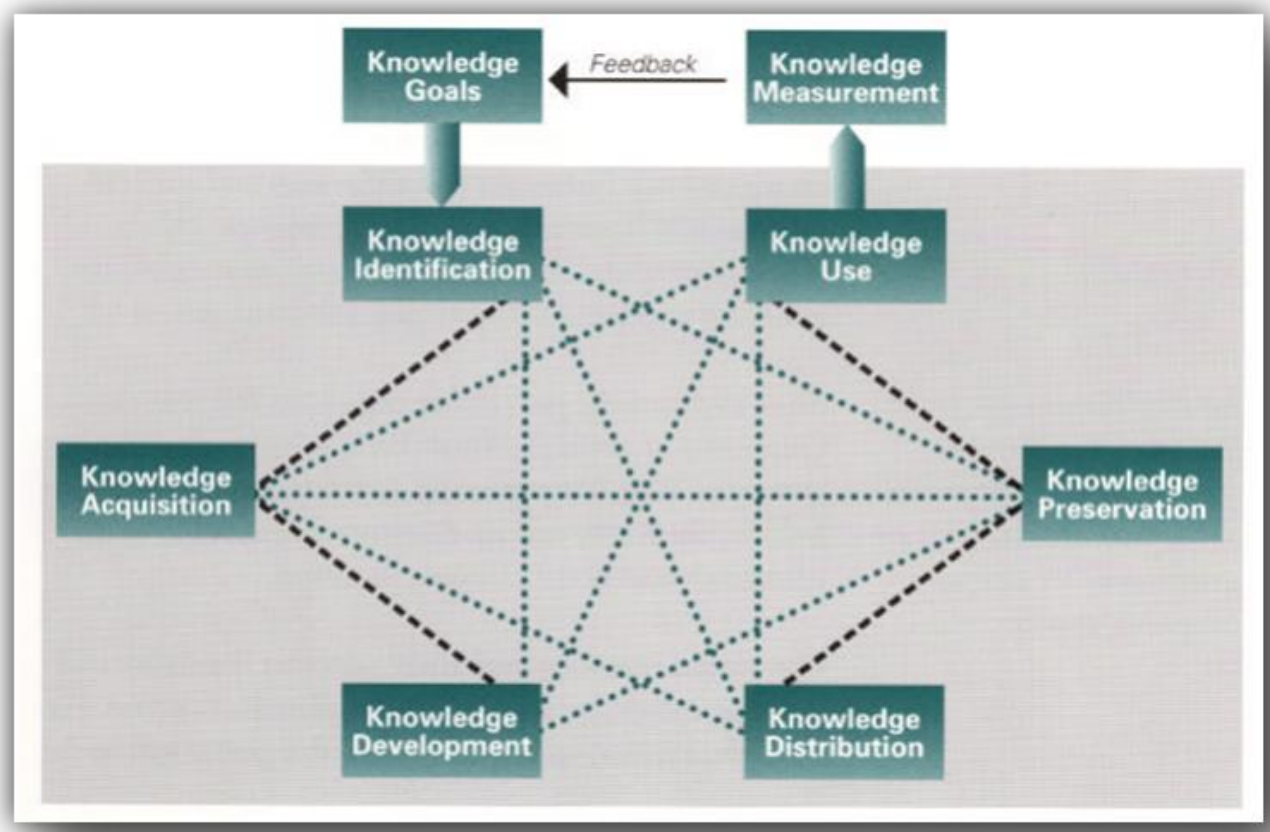


Figure 2.22: The Building Blocks of Knowledge Management

Source: Probst (1998:2)

2.7.8 Knowledge Management Pillars

Wiig (1993) in Holsapple and Joshi (1999: 2) describes KM as three functions, conceptualised as pillars. The KM Pillars model, in essence, is a synthesis of KM processes. The model identifies knowledge creation, manifestation, use, and transfer as the primary KM processes and then elaborates on these by identifying a number of other processes as part of the pillars, as depicted in Figure 2.23.

The model does however not make mention of the importance of leadership, strategy, structure, culture, resource management and security. The model also does not provide insight on issues of integration. This said the model provides a firm baseline in terms of KM processes to build on. A more comprehensive model would be achieved if the KM Strategy Focus Areas model of Wiig (Figure 2.17) was integrated into this model.

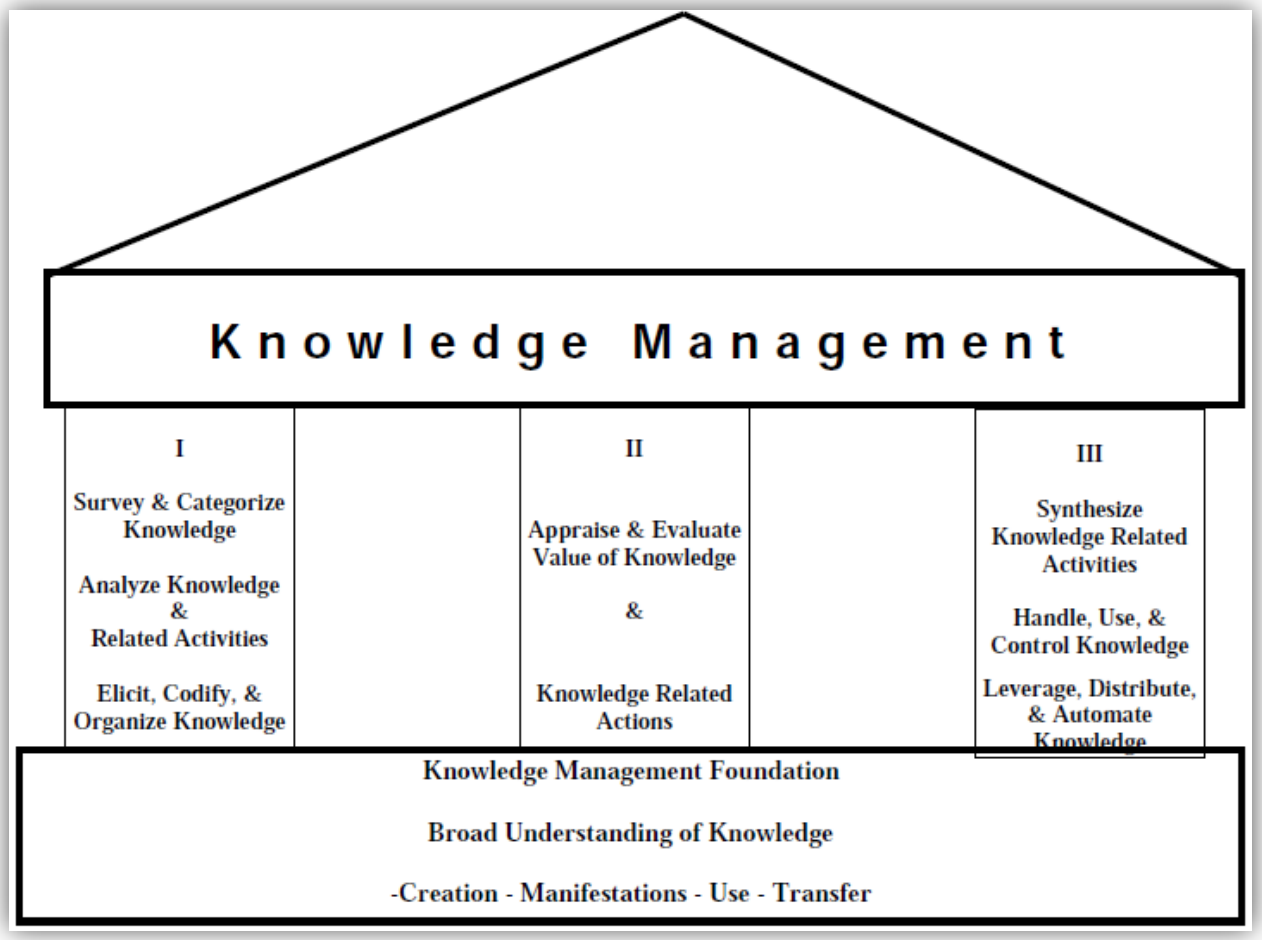


Figure 2.23: Knowledge Management Pillars

Source: Holsapple & Joshi (1999: 8).

2.7.9 Model of the Knowing Organisation

Choo (1996) posits that organisations apply information strategically to facilitate sense-making, knowledge creation, decision-making and action. Sense-making, knowledge creation, and decision making are - "… linked as a continuum of nested information activities that define an organization which possesses the information and knowledge to act intelligently" (Holsapple & Joshi, 1999: 2).

This corresponds very well to the elements of the OODA loop. Information and knowledge are also not delineated and defined by Choo (1996) according to Holsapple and Joshi, (1999). However, this is typically an information era approach – where IM is recognised as the strategic process and not the product of KM. Decisions and actions are an integral part of organisational activities without which the organisation cannot survive and/or compete. From the earlier discussion in the dissertation, KM enables the creation of new meaning through sense-making and enhanced understanding, decision-making and action.

These elements underpin this model and are important for a proposed SA DOD KMC. The model also, in a sense, supports the notion of a knowledge continuum rather than that of a hierarchy. The Knowing Organisation model is depicted in Figure 2.24.

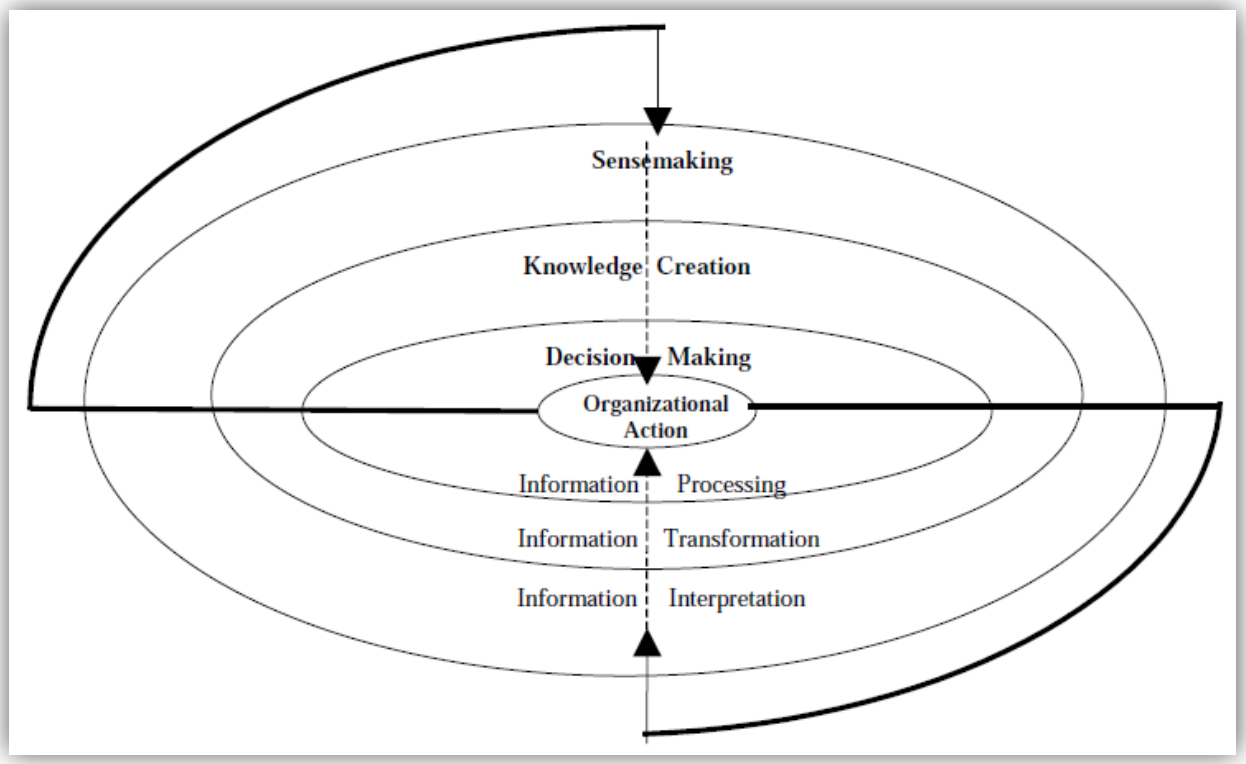


Figure 2.24: Model of the Knowing Organisation

Source: Holsapple & Joshi (1999: 9).

2.7.10 A Framework of Knowledge Management

Van der Spek and Spijkervet (1997) in Holsapple and Joshi (1999: 10) propose a cyclical approach to KM involving four phases - "… conceptualize, reflect, act, and retrospect", moving clearly away from IM towards KM. Again these correspond with the OODA loop activities – "The configuration of KM stages is oriented toward a problem-solving cycle" Holsapple & Joshi (1999: 3).

Conceptualise probably closely conform to current practices of knowledge audits before setting out to construct a KMC. Added is a function to evaluate decisions and actions after the fact, thus facilitating learning. In fact, KM processes are recognised as part of a strategic or planning cycle within the constraints of the internal and external environmental dynamics. Learning is important for corrections and best practice formulation. Retrospect also implies some form of learning and measurement. Another important aspect identified by the model is the recognition of influences from both the internal ("culture, motivation of employees, organization, management, and information technology" (Holsapple & Joshi, 1999: 3) and external environment – agreeing with the notions of relational IC and those posited by Sveiby (1997) as IA (customer and supplier relationships). The model is depicted in Figure 2.25.

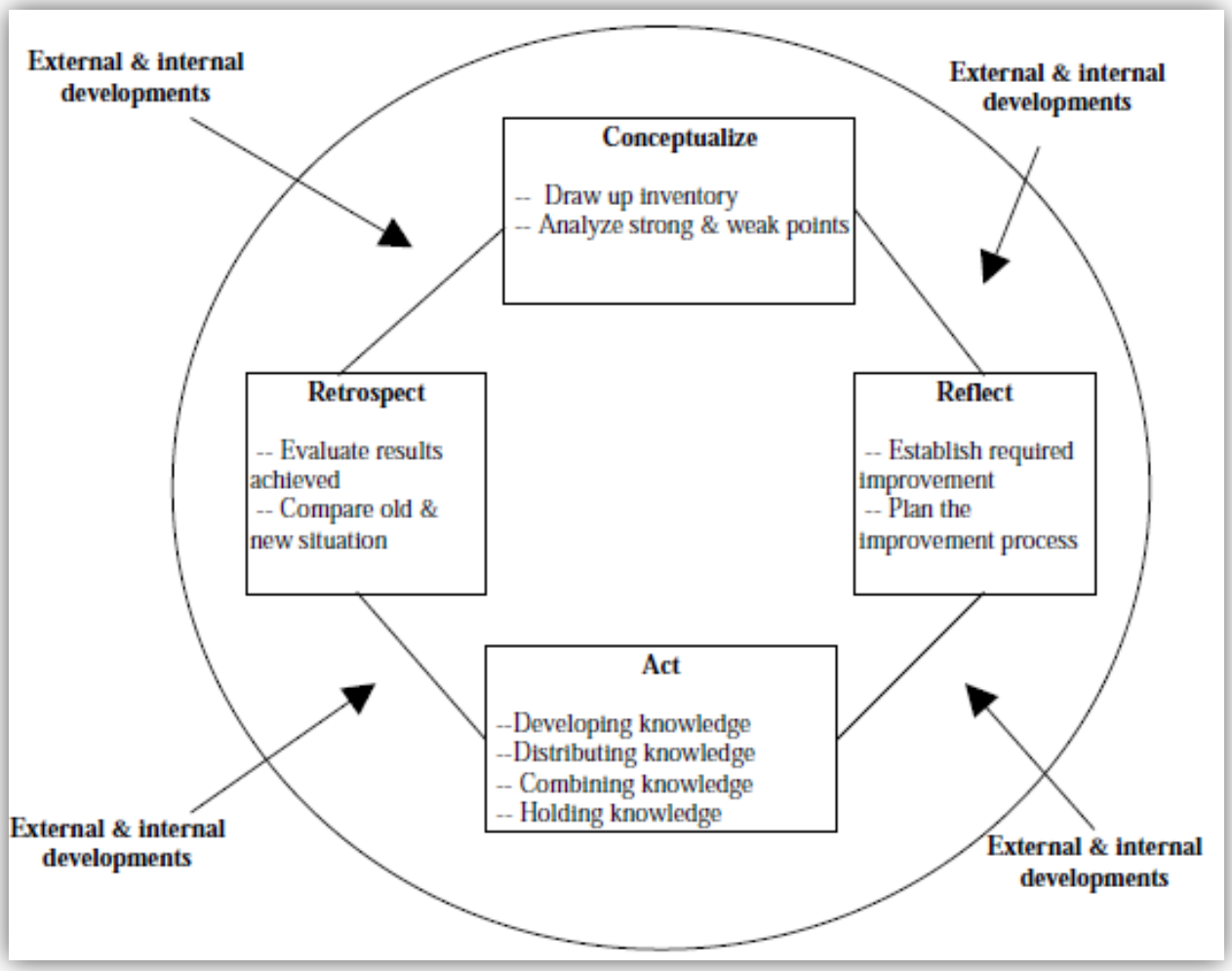


Figure 2.25: A Framework of Knowledge Management

Source: Holsapple & Joshi (1999: 10).

2.7.11 Knowledge Management Solution Model

The Knowledge Management Solution model (Becerra-Fernandez, Gonzales & Sabherwal, 2004) is an important model to consider because it identifies key KM processes, KMS, KM best practice techniques (or 'mechanisms') and IT as well as KM architecture. There are also elements of IC (routines and common knowledge) but mostly IC is not addressed. Rather, mention is made of "common knowledge" – probably closely related to explicit knowledge. The model is depicted in Figure 2.26.

The model also moves clearly away from IM towards KM. The SECI model is very evident in the model as the preferred knowledge creation processes, confirming again its significance in terms of knowledge processes. However, the model does not express a vision for KM. Also, some of the KM CSFs are missing from the model – a primary CSF being leadership, people and measurement. Another concern is the absence of clear linkages to strategy (possibly inherent in 'direction' under knowledge application. That said, there is no linkage to organisational (business/corporate) strategy. Another concern for the researcher is that there is no mention of KM

security/protection. From the model below it is clear that KM theory has developed considerably up to 2004.

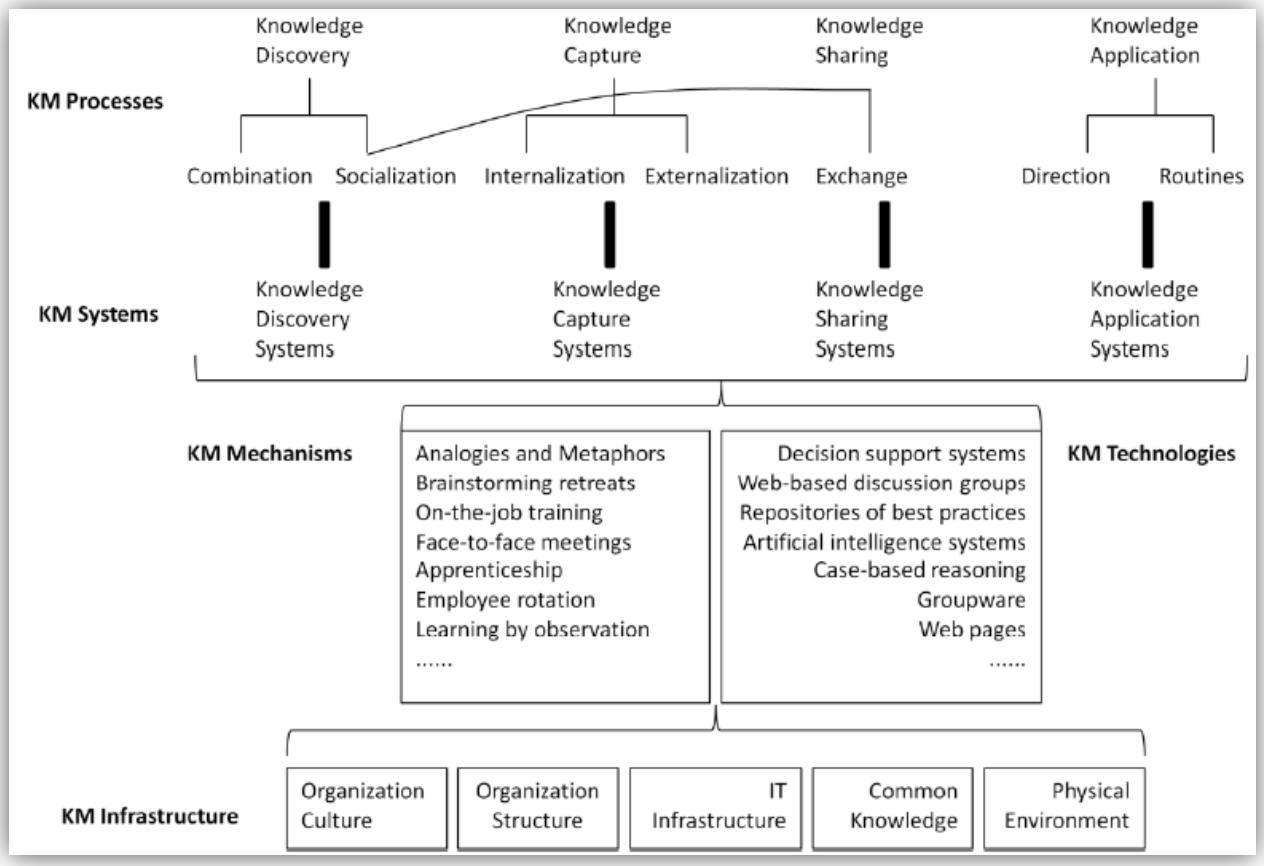


Figure 2.26: Knowledge Management Solution Model

Source: Arthur (2013: 7).

2.7.12 Architecture Model for Integrated Knowledge Management

The Architecture Model for Integrated KM (Figure 2.28) synthesises most of the KM CSF and processes discussed earlier in the dissertation and in the KM models briefly discussed above. Riempp and Smolnik (2007) propose an integrated KM Architecture Model based on what they propose as key levers, superimposed over a systems-processes-strategy architecture with organisational culture providing the base upon which the organisation is constructed.

The Architecture Model for Integrated KM proposes to integrate KM and organisational strategy in both a horizontal and vertical plane. This architecture provides a graphic explanation of organisational strategy, process and system interaction to be achieved at a glance. This is lacking in other models. This proposed architecture provides a more understandable depiction of the role of organisational strategy, process and systems interaction than that of the Inukshuk KM model.

Knowledge Management Solution model (Figure 2.26) of Becerra-Fernandez, Gonzales and Sabherwal (2004), the Uit Beijerse (1999) KM model (Figure 2.27), and Architecture Model for Integrated KM (Figure 2.28) of Riempp and Smolnik (2007) were developed for business organisations; featuring several similarities that can be adapted for public organisations such as the

SA DOD, because it has been established above that there are clear coincidences between the Inukshuk KM model and these models.

Briefly considering the Uit Beijerse KM model (1999), depicted in Figure 2.27. The model is structured around primary components already discussed thus far. These are a requirement for advantage, elements of organisational strategy and structure, the direction of KM (policy), KM processes and organisational culture.

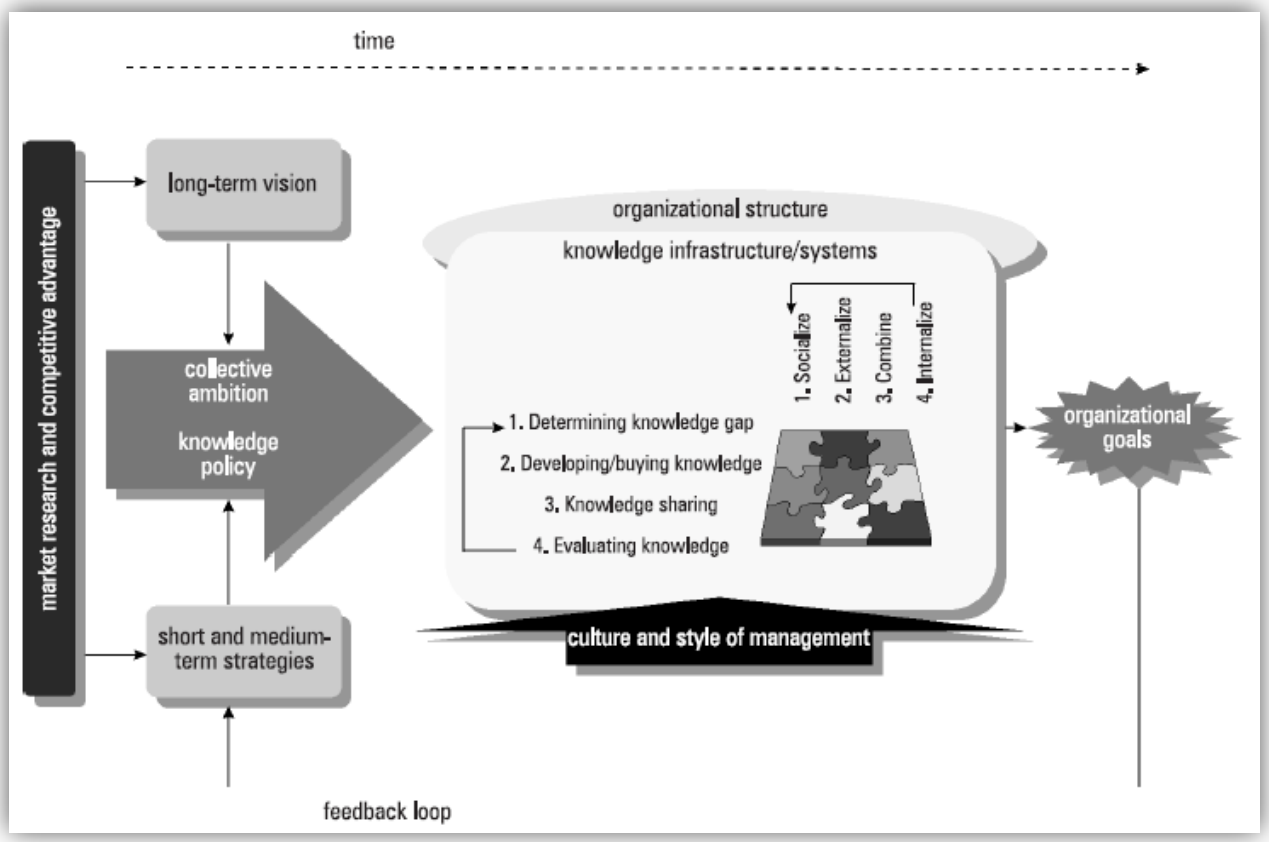


Figure 2.27: Uit Beijerse Knowledge Management Model

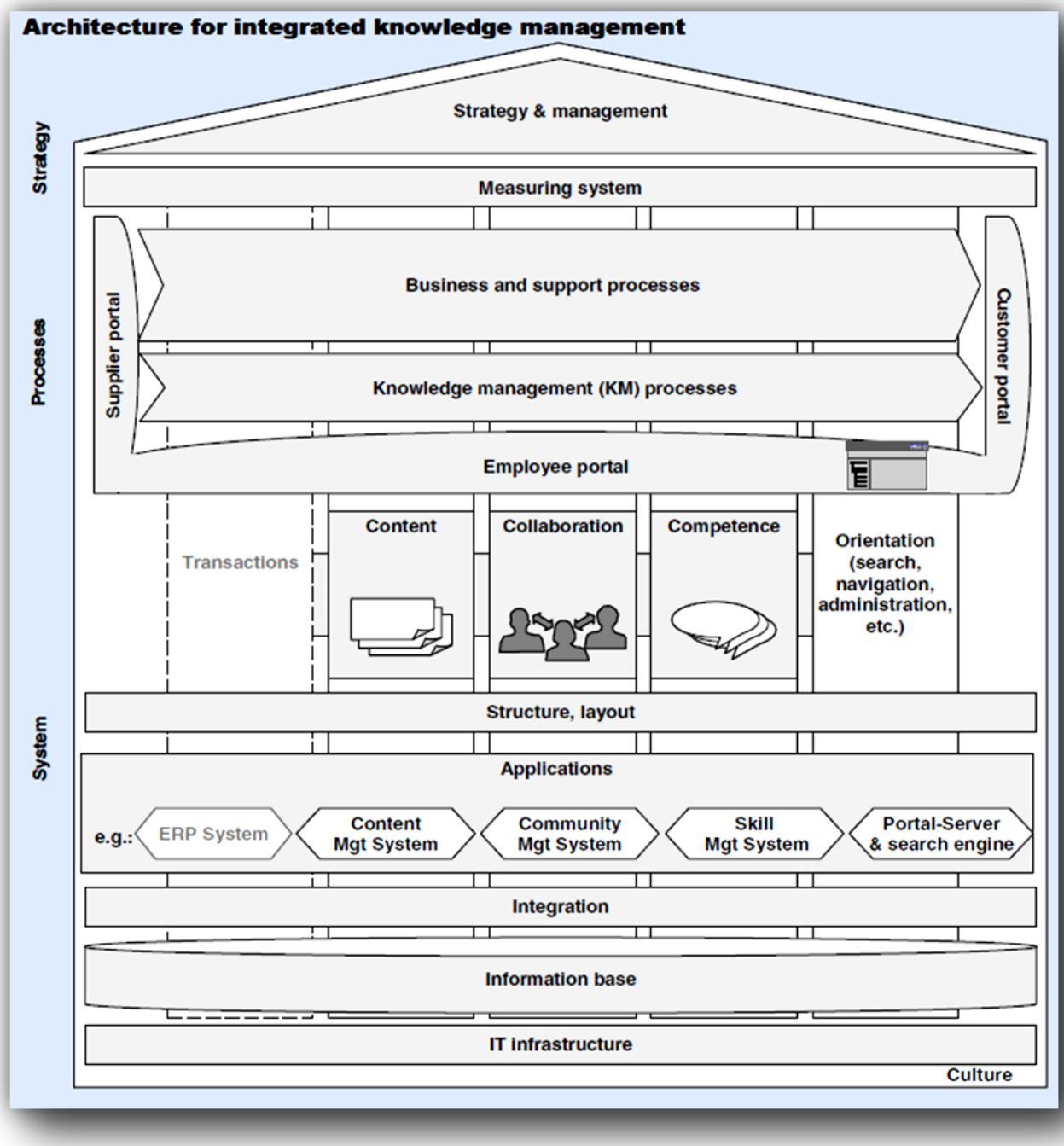
Source: Uit Beijerse (1999: 104).

SECI is acknowledged as a central feature to transform knowledge. Acknowledgement is also given to the ability to acquire knowledge. Another important feature is a knowledge audit to do knowledge gap analysis, which is distinctly linked to competitive advantage. Distinctly missing from the model is an indication of KM leadership. However, there is mention of 'style of management' which could be linked to the style of leadership in the absence of leadership being mentioned distinctly. This style is important to processes such as knowledge sharing and knowledge security (which is not mentioned distinctly).

The four levers in the Architecture Model for Integrated KM (Figure 2.28 below) of Riempp and Smolnik (2007) have a strong coincidence with the model proposed by Girard (2004) – the Inukshuk KM model. There is also a coincidence between the proposed Uit Beijerse (1999: 104) KM model and those of Girard (2004) and Riempp and Smolnik (2007). Hassan and AL-Hakim (2011) incorporate many of the elements of the Inukshuk KM model and the work of Uit Beijerse

(1999) and Riempp and Smolnik (2007) – and label them as CSF for KM. Interestingly, Hassan and AL-Hakim (2011) do not cite Uit Beijerse (1999), Girard (2004) or Riempp and Smolnik (2007) in their work.

Shariq (1997: 76) states three activities inherent in knowledge processes, i.e. knowledge creation, -transfer and – deployment. Henderson (1995: 3) in Grant (1996a) makes a case for the architecture of knowledge based on the - "… integration of knowledge across disciplinary and organisational boundaries". Girard (2004), Uit Beijerse (1999) and Riempp and Smolnik (2007) therefore build on this earlier understanding of the activities within KM. Riempp and Smolnik (2007) build on the understanding of several writers by acknowledging business processes and KM



processes as a distinct layer, implying integration.

Figure 2.28: Architecture for Integrated Knowledge Management

Source: Riempp & Smolnik (2007: 9).

In order to conclude section 2.7 dealing and discussing several KM models, the researcher does not adopt any of these models as an appropriate model for SA DOD KM. However, the varied and various components constituting these models will be considered in the construction of an SA DOD KM model in chapter 6 of the thesis.

2.8 THE GAP IN THE LITERATURE

When considering the research problem and questions; there are only a handful of studies addressing KM in the SA public sector, e.g. Noeth (2004), La Grange (2006), Onyancha and Ocholla (2006), Cloete (2007), Onyancha and Ocholla (2009). Kruger and Johnson (2009), Onyancha (2011) and Arthur. (2013), amongst possible others. The mentioned studies do not include research on SA DOD KM specifically. There is no distinct academic research on SA DOD KM. Thus, no knowledge and KM definitions and theory/practice on SA DOD KM exists. This could be due to a lack of interest in this particular type of management; it could be that the SA DOD is not aware of this type of management; and/or it could be that the security regime within the SA DOD hampers such endeavours?

There also seem to be a gap in the literature reviewed addressing KM security requirements. The document analysis and subsequent questionnaire research within the SA DOD might shed light on these and other questions regarding the perceived absence of KM within the SA DOD.

2.9 CONCLUSION

The fact that there is still no agreement on the definition of knowledge hampers the development of KM as a management discipline. Knowledge remains an extremely contextual phenomenon resulting in academics, businesses and militaries defining knowledge such that it makes sense for their particular working environments.

In general, knowledge is more than information and information are more than data. For the purpose of this dissertation, the researcher regards data as a representation of observations and/or facts without context, i.e. not meaningful by itself. Data is the least complex form of explicit content.

For the purpose of this dissertation the researcher regards information as data in context and can combine various sets of data into limited meaning and understanding. The researcher agrees with this description and adopts this view for the purpose of this dissertation.

Knowledge is considered information in context, combining various sets of information to provide the clearest (or dense) meaning and understanding. There is broad consensus that knowledge exists in people, technology and organisations; in tacit or explicit forms. Knowledge is

dynamic and evolves, continuously resulting in new understanding and meaning. There is also broad agreement on the fact that knowledge is critical to survival and advantage.

A very large and expanding body of knowledge about KM in general, including some key management concepts, theory and models that are conceptually useful exists. However, it is when drilling down to more complex and specific management environments such as the military that the body of knowledge is spread across greater intervals; becomes very organisational and country-specific; deals with specific operational challenges; and more than often deals with IT, IM, communication and technology issues.

A key issue hampering the development of KM as an academic and scientific discipline is the lack of agreement on definitions for knowledge and KM. Hence, academics must formulate definitions of these to support their research and application in the workplace. For this dissertation - definitions for knowledge and KM are proposed at the end of Chapter 3 of the dissertation once KM in the military have been discussed and considered. However, at this point the researcher is of the opinion that knowledge is meaning based on the construct of IC that should contribute to decision-making, actions carried out, effects to be achieved as well as advantage. Data and information also facilitate this, however, basing decision, actions, effects and advantage on an incomplete or sparsely populated operational or business picture would undermine the quest for advantage and might well affect the ability to survive.

It is very evident from the literature that organisational performance can be enhanced by KM initiatives. A logical (and widely acknowledged) deduction is that KM is important to any organisation in order to improve the ability of the organisation to survive, compete and build inimitable capabilities to sustain their advantage, whether in the private or public sector.

There is unambiguous and empirical support for several core components to be incorporated in KM policy, strategy and KM models. These are typically, as discussed above - leadership, a KM culture or organisational culture that facilitate KM, a learning organisational culture, a good balance for the requirement of security vs. knowledge sharing or access to knowledge, a KM strategy that provides for KM related organisational structure, people and processes that manage knowledge, IT and other communication technologies that enable KM strategy execution. Issues of a KM vision, mission and objectives, resource management, funding, monitoring and evaluation, etc is included in organisational strategy and KM strategy. The application, combination and focus of these will vary between organisations due to environmental and organisational complexities, requirements, resources, visions and goals.

Knowledge management CSFs inform the argument why the SA DOD should be interested in KM (SRQ 2). In the SA DOD context, these CSFs should inform and calibrate a proposed KMC (SRQ 4) which will be discussed when the findings of the literature review, document review and interview material are integrated into findings and possible answers to the research questions (see dissertation Chapter 8).

Knowledge management CSF and best practice should form the bedrock of organisational performance, the crafting of KM policy, strategy and KM models for any organisation. Organisations should thus have KM policy and strategy and embed them into organisational architecture. The question is - Does the SA DOD have policy and strategy on KM that integrates

knowledge resources and organisational architecture into a KM capability in order to unlock optimal KM benefits? These issues will be explored next from a military perspective in Chapter 3 of the dissertation and SA DOD perspective in Chapters 5 and 6 of the dissertation. The discussion above contributes to the crafting of a definition for KM in the SA DOD at the end of Chapter 3 of the dissertation.

There are several studies that explore South African interest in KM as a field of study. The published material on South African public sector KM does not address the SA DOD and military (as an SA government department).

There is well-documented support for the following:

- KM will enhance the organisations' ability to cope with complex business/operational environments.
- KM enhances competitive advantage and is a requirement to attain military advantage.
- That knowledge is not information and information is not data, but that these concepts interact in a hierarchical manner, but probably more as a continuum – each having different management requirements.
- KM requires an integrated approach and must be integrated into the organisational architecture.
- KM is not IT management or IM. These are enablers to KM.
- Organisations require a KM strategy that is informed by the business strategy.
- Critical success factors for KM are leadership, organisational strategy, organisational structure, organisational culture, HRM, IT, KM impact measurement, security and a learning organisation. All of these must be aligned and integrated into a strategy to facilitate effective knowledge processes and to enhance decision-making, actions, effects and advantage.

Chapter 3 of the dissertation focuses on a case study of military KM with a distinct focus on the USA military KM initiatives. Hampering the case severely is the fact that, comparatively, very little military KM publications exist; also, access to all or very specific military organisational documentation is restricted and thus limits the analysis. Based on the availability of USA military organisational KM related documents, these will be analysed and supplemented by thinking on military KM from around the world where available.

CHAPTER 3

LITERATURE REVIEW: MILITARY KNOWLEDGE MANAGEMENT IN PRACTICE

3.1 INTRODUCTION

> *"In 50 years' time, we will be* [preparing for and fight wars] *we don't know,* [using knowledge, technology and] *materials which haven't been invented, made in processes [and with knowledge] yet to be defined,* [at processing speeds that increase exponentially], [in countries that might not exist currently], [with soldiers and leaders] *we have not yet recruited. Under these circumstances, all we can carry forward is our knowledge, and our knowledge of how to improve our knowledge.''*
> (Adapted from Siemieniuch, 1997 in Ďurišová, 2011: 45)

The chapter moves away from general and business related KM theory and introduces military KM as practised by a number of militaries. The chapter can be considered as part 2 of the dissertation literature review, also following a document analysis approach.

The USA military publishes on its KM practices and experiences in the public domain. This chapter seeks to create a top-down view based on the USA military, (arguably) the leading military knowledge manager.

To establish context, the chapter provides background on KM in militaries and possible arguments for its necessity. The chapter then introduces USA KM and how it has evolved to the point where KM is accepted by the USA military as being vital. The USA military is used as a case study purely because of the availability of published documents. It would be impossible to explore KM in the military without any published material or access to military personnel. The US military makes it possible due to the availability of published material. No correlation between the USA military and the SA DOD is insinuated.

The chapter extracted (where possible) applied examples of definitions, types of military knowledge, and how it should be managed in order to assist with search criteria for the writing of Chapters 5 and 6 and to support findings.

3.2 CONTEXT

> *"If you know your enemy and know yourself, you need not fear the results of a hundred battles. If you know yourself but not the enemy, for every victory gained you will also suffer a defeat. If you know neither the enemy nor yourself, you will succumb in every battle" (Giles, 1910, Chapter 3,* Paragraph 18 [online]).

Sun Tzu's wisdom quoted by Giles above is possibly the most fundamental truth about military knowledge. It also reveals the longevity of military KM and the importance of 'knowing' for militaries. Centuries later the USA military reiterates the wisdom of Sun Tzu with the following –

> *"It is telling that joint doctrine[53] defines "data" and "information", but not knowledge. Data and information, however, are objects to discover and manipulate. They are important to offensive operations, but not sufficient. To get ahead of our enemies, we must know their goals, understand their strategies, anticipate their maneuvers, and then force our enemies to change their behavior consistent with our national security objectives. This level of knowledge is central to the art of modern war."* (USA, 2008: 8).

The quote above resonates the wisdom of Sun Tzu about 'knowing'. Just being informed is not good enough. Knowledge management has been an integral part of militaries for millennia as is evident in the quote above but also evident in military intelligence[54] practices (Manuri & Yaacob, 2011). "KM, intelligence applications, and decision-making skills have been at the forefront of military doctrine over the past decades." (Lambe, 2003 in Manuri & Yaacob, 2011: 77). This quote highlights several key components to military KM – e.g. intelligence and doctrine as capstone military knowledge and their link with decision-making as a critical organisational activity.

Debates on knowledge and KM are often philosophical in nature (Kruger & Johnson, 2009). The development of KM theory has a philosophical path as well as an organisational demand path (mostly discussed in the latter part of Chapter 2 of this dissertation) for practical KM infusion in the work environment (Zhang, 2013: 18). This is not different for militaries. "KM application within [the] military environment requires knowledge processes that are robust and reliable within operational contexts and the knowledge creation and conversion processes must match the pace of the military operations." (Manuri & Yaacob, 2011: 77). The quote highlights aspects that were discussed in Chapter 2 of the dissertation, such as the criticality of KM processes tailored for both environment and organisation and the time value of knowledge.

Considering the opening remarks on complexity associated with military environments and operations articulated in Chapter 1 of the dissertation and Manuri and Yaacob's (2011) opinion above; the fact is highlighted that KM is a reality for military organisations and not just a philosophical phenomenon or exercise. However, military KM is grounded in the philosophical debate about knowledge and KM. To place perspective on the scope of military KM; Maule (2006: 627) writes -

> "The military is extremely diverse in its knowledge systems and practices. In the collective, the military would be the equivalent of many large corporate conglomerates, each with multiple research and development [research and development] branches. Adding to the complexity is the secrecy of many of the systems. To attempt to summarize military knowledge management in its entirety would be presumptuous, if not impossible.".

Yet, the availability of published military KM material pales in comparison with publications on business orientated KM. To place this in perspective, the Encyclopaedia of Knowledge Management (2nd edition) is a 1560+ page book that includes only one 11 page article by William

[53] Incidentally, the DOD Dictionary of Military and Associated Terms 2017 (US, 2017) does not provide a definition for doctrine. This definition can be obtained in the DOD Dictionary of Military and Associated Terms 2001 version (page 165), also known as USA Joint Publication 1-02.

[54] "The product resulting from the collection, processing, integration, evaluation, analysis, and interpretation of available information concerning foreign nations, hostile or potentially hostile forces or elements, or areas of actual or potential operations." (US, 2017: 116)

Maule on military KM and reveals a USA military perspective (the Naval Post Graduate School, Monterey).

The leader in contemporary military KM (based on the available academic material and other published and online documentation) is the USA. As such, the 2008 USAF ISR Strategy states - "No military has ever fielded the knowledge capabilities we intend to deploy." (USA, 2008: 8). Capabilities indicate the integration of various systems and sub-systems. Other militaries that published KM material are the UK, Canada, Germany, Australia, Malaysia, Japan, South Korea and Singapore (Manuri & Yaacob, 2011). The USA military was selected for the case study, not due to its size or military leadership position or any other bias, but purely due to the availability of organisational documents in the public domain that could be used to compare with the discussion in Chapter 2. Thus, the researcher uses the USA KM experience as a small case study using documents in the public domain with supplementing opinions from academic material emanating from other countries where available. The following section focus on military KM – a more practical, military demand perspective.

3.3 THE IMPORTANCE OF KNOWLEDGE MANAGEMENT FOR MILITARIES

It can be safely assumed that KM is important to militaries due to the fact that militaries, internationally, subscribe to most business (best) practices in order to provide effective and efficient defence and security services and related products. Based on this assumption, the question is raised why only a handful of militaries – arguably international military leaders from typically the developed world – are actively developing KM initiatives. This relates to the second research question of this dissertation. To explore the posited importance of military KM consideration should be afforded to views of the few writers on military KM. The importance of military KM has been thematically grouped by the researcher below.

3.3.1 Survival, Advantage and Superiority

From the literature review (dissertation Chapter 2) it is abundantly clear that knowledge and KM are critical for organisations to survive, compete and gain/maintain the advantage. Degen (2008) states that KM is of utmost importance to cope with the complexities of the military tasks and environments (a USA perspective) – thus clearly relates KM to survivability and advantage. Not disagreeing, Manuri and Yaacob (2011: 75) state - "Knowledge has been identified as the ultimate competitive advantage for the modern organisation and therefore should be well managed".

Sometimes missed - "The contributions of military organizations to societal knowledge touch nearly every aspect of human endeavours" (Bennet, Bennet & Lee, 2010: 316). This quote signifies the importance of knowledge and KM for military organisations. Military organisations are the product of the societal need for security – with society directly benefitting from knowledge generated by militaries in its quest to provide such security. This knowledge requires management to render the best possible military and social benefits and advantage.

Militaries seek advantage, based on military capabilities, to be able to compete in operational environments (both physical- and cyberspace) and/or provide deterrence to prevent confrontation, thus making survival a more achievable outcome. From a deterrent (defensive) perspective the

2008 USAF ISR Strategy states it quaintly – "[USAF ISR] intend to produce thorough knowledge of every enemy that they will know – or immediately realize – that any conflict will be fought on our terms, to their detriment." (USA, 2008: 5). From an offensive perspective, Boothby (2012: 506) writes - "…the decision-maker, having considered the scientific data [information and knowledge] as to the relationship between the planned military action and the desired effect, assesses that the intended military advantage[55] is definite,…, the attack may proceed". Ignoring the possible construct dissonance; Boothby clearly links decisions based on knowledge to the success of actions, desired effects and advantage. Thus, knowledge provides militaries with military advantage as a deterrent but also as a success driver in battle.

KM is a CSF for USA military advantage and documented as such in several strategy documents (Marshal, 2007: 12). 2008 USAF ISR Strategy states - "Knowledge is now the 'fuel', the fundamental prerequisite for success" (USA, 2008: 8). Success is being driven by advantage; the advantage is being driven by knowledge; thus knowledge is driving success.

The USA DOD Joint Vision 2020 focuses on achieving information and knowledge superiority – states that - "…information superiority provides the joint force a competitive advantage only when [information] is effectively translated into superior knowledge and decisions" (USA DOD, 2000: 11 in Marshall, 2007: 12 and in USA, 2008). Manuri and Yaacob (2011: 73) - writing from a Malaysian Air Force perspective - echoes the USA requirement for information and knowledge superiority as key to future military advantage. Therefore, information superiority does not enable advantage. The prerequisite for advantage is knowledge superiority.

The 2008 USAF ISR Strategy summarises a description of what they regard as knowledge and its relationship with advantage (albeit from a knowledge superiority argument perspective) as follows – "No military organization can survive for long in the face of enemy knowledge superiority." (USA, 2008: 17). Thus, the creation of new meaning is critical for continued understanding and knowing which enables control over decision-action cycles and the commensurate effects that are critical for survival and/or advantage. This is true for market conditions and military operations. This is why knowledge and the management thereof are important in the knowledge era.

3.3.2 Enhanced Decisions, Actions, Flexibility, Adaptiveness and Responsiveness

Taking into consideration the discussion above expressing on decisions, action and effect; Lungu (2011: 16) writes from a Romanian military perspective that KM - "…contributes to the organisational effectiveness of logistics structures… by enhancing timely and effective decision-making processes, responsiveness and adaptiveness to changes through effective assessment of operational requirements based on complete knowledge".

USA military KM doctrine states the importance of KM as follows – "KM is more than improved information technology and communications systems. It supports all elements of the

[55] The definition of military advantage is a contested discussion in International Humanitarian Law – linking it to clear military objectives, attack and destruction of the objectives. From a more practical perspective, military advantage is more than just destruction, it is about winning the battle either before the battle starts, based on deterrence, or by decisively destroying the opposing force in battle. Offensive military goals are not only to destroy. They can include protecting, capturing and defending resources also.

operations and decisionmaking [*sic*] processes … Creating mission-specific knowledge by integrating contextualized information supports effective decisionmaking [*sic*], providing the basis for action." (USA FM6-01.1., 2012: 1-1 and 1-2). KM is important for militaries from a process perspective to enable the leveraging of knowledge as well as knowledge conversion in support of military action. (Manuri & Yaacob, 2011). The USA military (Army) KM perspective is as follows based on USA Army doctrine (ADP 5-0) –

> "Success in operations demands timely and effective decisions based upon applying judgment to available information and knowledge. As such, commanders and staffs seek to build and maintain situational understanding throughout the operations process. Situational understanding is the product of applying analysis and judgment to relevant information to determine the relationships among the operational and mission variables to facilitate decision-making." (Mortensen, 2014: 8).

Thus, military KM is critically linked to decisions and the time value of knowledge that affects the ability to be responsive, flexible and adapt to operational requirements and complexity. The USA FM6-01.1. (2012: 1-1) states that KM enables – "Leader and Soldier agility and adaptability during operations." and Mortensen (2014: 9) states – "Knowledge Management enables commanders to make informed, timely decisions despite the uncertainty of operations or the type of operations, and is becoming an inherent part of joint and combined operations, making KM a primary enabler of Mission Command.". The USA FM6-01.1. (2012: 1-2) states that KM enables the sharing of relevant information –

> "… as the commander transitions through understanding and visualizing the end state and operational approach, through the decisionmaking [*sic*] process, and ultimately to action. It provides critical insight for assessment, enhancing rapid adaptation during dynamic operations. While not all knowledge provides an operational advantage, an operational advantage can only be achieved through the effective and timely transfer of knowledge to commanders and other decisionmakers [*sic*].".

Successful military KM is measured -"…through the contribution to the capacity of forces to sustain operations, coherence in defence and operational planning, development and use of new capabilities, improvement of working and operating methods" (Lungu 2011: 115). These are important principles to be considered because all logistics and sustainment are military operational functions without which defence mandates are arguably not achievable. The OODA loop construct (Figure 3.5) is critical to military flexibility, adaptiveness and responsiveness in operations, but also in the corporate environment. KM enabled flexibility, adaptiveness and responsiveness are also a CSF in complex environments such as those militaries find themselves in, almost without exception. These aspects are illustrated by Figure 3.7 dealing with KM and enhanced decision-making.

The USA FM6-01.1. (2012: 1-8) states – "Conducting KM helps to create shared understanding, which is considered a mission command principle. The USA FM6-01.1. (2012: 1-5) states the following about understanding as a principle of KM -

> "Shared understanding across, between, and through commanders, subordinate leaders, Soldiers, and organizations underpins mission command and the operations process (or the conduct of operations). … Through collaboration and dialogue, knowledge sharing enables an

> understanding of the operational environment, problems to be solved, and approaches to solving them. Effective KM practices enable commanders, subordinate leaders, Soldiers, and organizations to work together to achieve operational goals. KM facilitates the transfer of the "how" in the form of knowledge (tacit and explicit). Understanding is primarily an individual process; therefore its domain is the tacit knowledge that resides in individuals.".

Mortensen (2014) states –

> "Knowledge Management (KM) supports the commander by providing the bridging focus between the art and science of command. … Knowledge Management helps the Commander focus these processes by enabling knowledge flow to enhance shared understanding, learning, and decision-making. KM balances people, process, tools, and organization, in order to create a shared understanding through the alignment of people, processes, and tools within the organizational structure and culture, in order to increase collaboration and understanding. The resulting improved knowledge flow and shared understanding, results in better decisions, resulting in improved flexibility, adaptability, integration, and synchronization." (Mortensen, 2014: 9).

As a staff task under the science of control, conducting KM is key to integrating the operations process. Thus, the symbiotic relationships between the military construct of mission command and the construct of KM spawn the ability of militaries to Command and Control (C2) their capabilities, actions and effects and enhance decision-making, flexibility, adaptiveness and responsiveness – all critical to creating effects and advantage.

3.3.3 Actionable, Decision-quality Intelligence and Knowledge

The 2008 USAF ISR Strategy clearly states the requirement for - "…actionable", "…decision-quality" intelligence and knowledge (USA: 2008: 4, 8, 9 & 16) as products of persistent surveillance (data, information and knowledge collection), intelligence (data, information and knowledge collection, processing, collation, analysis and distribution) and reconnaissance (data, information and knowledge collection) activities. These are, incidentally, three key military KM processes with which to dominate the opponent's OODA loop, enhancing decisions, actions, effects and unlocking advantage. The 2008 USAF ISR Strategy labels these effects – "…tailored effects" (USA, 2008: 4), thus alluding to quality and accuracy possible when having access to actionable and decision-quality intelligence and knowledge.

'Decision-quality' provides the link between knowledge and enhanced decisions – presupposing a particular quality of knowledge in order to arrive at better decisions in terms of the time it takes to arrive at decisions for action and the tailored effects they would achieve.

The 2008 USAF ISR Strategy summarises a description of what they regard as knowledge and its relationship with advantage (albeit from a knowledge superiority argument perspective) as follows -"When the information age makes unprecedented quantities of data available to practically any group, knowledge superiority depends on qualitative differentials: identifying the specific target [who/what] and directing the right matter [what] to the right space [where] at the right time [when] within the opponent's observe-orient-decide-act (OODA) loop." (USA, 2008: 17). This requires an integrated KM and intelligence capability. The 2008 USAF ISR Strategy states the following about the relationship between meaning, understanding and intelligence –

> "… disparate data can be synthesized to provide understanding which creates knowledge. The entire system, human and machine, needs the ability to combine seemingly unrelated data to create understanding. Superior training in the art of intelligence can greatly increase the ability to synthesize data and find meaning." (USA, 2008: 17).

This statement refer to intelligence as a process and clearly differentiate between data, intelligence. The USA FM6-01.1. (2012: 1-2) states the following about KM's role in relevant, decision-quality knowledge –

> "Commander's critical information requirements focus knowledge product development. Leaders acquire knowledge by understanding the processes, activities, and systems available to share information. Commanders and staffs evaluate KM effectiveness by determining whether it reduces the fog of war. KM narrows the gap between relevant information commanders require and that which they have. The staff organizes knowledge for the commander through KM.".

This is reiterated further by – "The KM process also seeks to ensure that knowledge products and services are relevant, accurate, timely, and usable to commanders and decisionmakers [*sic*].". These are all qualitative attributes of knowledge required for actionable, decision-quality intelligence and military knowledge. (USA FM6-01.1., 2012: 1-4). This again refer to a tailored product other than volumes of data and information.

3.3.4 Risk Mitigation

Lungu (2011: 16) explains that KM is critical to mitigating the negative effects stemming from the complexity and continuous evolution of security and military environments, rapid progress in technology developments and increased demand for flexibility, adaptability and responsiveness, amongst others. This mitigating effect is brought about through the creation of new meaning and understanding which becomes available to decision-makers.

3.3.5 Enabling Strategies

Knowledge management strategy is positioned as pivotal to the military information revolution as well as a critical enabler for military operations, knowledge generation, information sharing and technological innovation (Browning, 2002 in Manuri & Yaacob, 2011: 74). The USA Army Knowledge Management is positioned as the transformative strategy to achieve network centricity and a knowledge-based force (Santamaria, 2002 in Manuri & Yaacob, 2011). The USA FM6-01.1. (2012) elaborates extensively on the use of KM strategies and their importance. These are just some instances that express the importance of KM strategy to military organisations and operational aspects.

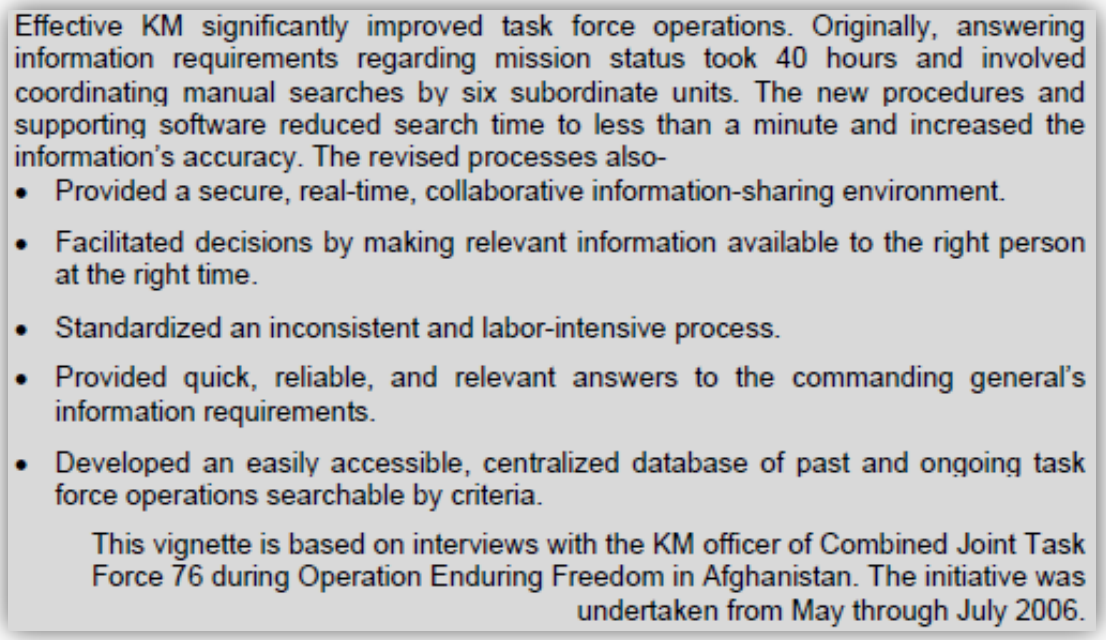
3.3.6 KM Processes and Efficiency

The USA military KM doctrine posits that KM enhances collaboration between USA military and other relevant people in any given location. This enables rapid knowledge sharing and transfer which are critical KM processes to decision-making and action. (USA FM6-01.1., 2012: 1-1) Mortensen (2014: 9), based on ADP 6-0, states that one of the principles of mission command is the creation of shared understanding. Mortenson (2014) states further – "One of these specified tasks – creating a shared understanding – is an important objective of a knowledge management program.

This doctrinal link between the principals of Mission Command and Knowledge Management makes KM an essential enabler of Mission Command." (Mortensen, 2014: 9).

Mortensen (2014) is of the opinion that KM enhances the effectiveness of employees. He states - "If the KM team gets it right, the Commander spends his time making critical decisions, and not trying to find documents." (Mortensen, 2014: 10). Knowledge management is also posited as an enabler for doctrine development; doctrine being considered capstone[56] military knowledge. Knowledge management enhances the learning qualities of the organisation through knowledge development and methods such as lessons learned programmes. In general, KM assists the organisation to use the available knowledge effectively and efficiently. (USA FM6-01.1., 2012: 1-1).

A practical example of illustrating effectiveness and efficiency achieved during a real military operation by the USA in Afghanistan during 2006 is depicted in Figure 3.1 -


Effective KM significantly improved task force operations. Originally, answering information requirements regarding mission status took 40 hours and involved coordinating manual searches by six subordinate units. The new procedures and supporting software reduced search time to less than a minute and increased the information's accuracy. The revised processes also-

- Provided a secure, real-time, collaborative information-sharing environment.
- Facilitated decisions by making relevant information available to the right person at the right time.
- Standardized an inconsistent and labor-intensive process.
- Provided quick, reliable, and relevant answers to the commanding general's information requirements.
- Developed an easily accessible, centralized database of past and ongoing task force operations searchable by criteria.

This vignette is based on interviews with the KM officer of Combined Joint Task Force 76 during Operation Enduring Freedom in Afghanistan. The initiative was undertaken from May through July 2006.

Figure 3.1: USA Military – An Example of Real KM Effect

Source: USA FM6-01.1. (2012: 3-18).

Knowledge management is thus an important capability required by the military to enhance decisions, actions, effects and advantage.

3.4 USA PERSPECTIVE ON MILITARY KNOWLEDGE MANAGEMENT

A short case study is based on the use of KM by the USA military. This is not based on its relative position of military power, complexity and size, but purely on the availability of published material. The case study material is supplemented, where available, with published literature

[56] "capstone publication — The top joint doctrine publication in the hierarchy of joint publications that links joint doctrine to national strategy and the contributions of other government departments and agencies, multinational partners, and reinforces policy for command and control." (US, 2017: 31)

elaborating on the military KM perspectives from other countries. Due to the scant availability of published military KM material, supporting views from other published military KM material will be based on the availability of and not on any systematic methodology.

Military KM is a continuation of the discourse about organisational KM demand due to the perceived impact of KM on organisational survival, competitiveness and advantage. A discussion on the USA military KM aims at demystifying why the SA DOD should be interested in KM (SRQ 2), what military knowledge categories and types should be management (SRQ 3) and contribute to the construction of an SA DOD KM model (SRQ 4). The discussion will not attempt to analyse all the available USA military policy and doctrine on KM but will focus the analysis and discussion on answering the research questions. The focus of the analysis will also hover at the strategic level rather than drilling down into tactical solutions which will be highly contextual. Let us first consider how the USA military KMC came into being.

3.4.1 USA Military Knowledge Management Development: A Historical Overview

Mortensen (2014: 7) states an example of very early origins of USA military KM –

> "The concept of collecting, analyzing, and distributing knowledge is not new to the U. S. Army. From the inception of the Continental Army in 1775, General George Washington developed organizations and processes designed to collect and disseminate information about British and American forces. Which means, the basic concepts of knowledge management are not new to the American Army; what is new is how we think of about the management of that knowledge.".

Bartczak and England (2005) write a brief history on the origins of USA military KM and the challenges faced initially. The USA Air Force Material Command [57] is the origin for USA military KM, which commenced with the recognition of the requirement in the early 1990s, labelling it USA Air Force Knowledge Management. Bartczak and England (2005) thus place the start of USA military KM in the corresponding period that contemporary KM started as discussed earlier in chapter 2 of the dissertation. Since then the USA Army launched an initiative named the Army Knowledge Online which evolved into Defence Knowledge Online (Barquin, 2011: online). In 2008 the USAF published the 2008 USAF ISR Strategy which institutionalises KM further in the USAF.

The USA military thus recognised the importance of KM for military requirements from virtually the very beginning of contemporary KM (the USA military started in the early 1990s with the USAF the first to implement KM, the USA Army started implementing *circa* 2003). By 2014, Mortensen (2014: 7) was of the opinion that USA military KM doctrine was still emerging. Currently (2017), the USA FM6-01.1. (2012) is USA military KM doctrine as implemented and practised.

What the USA military also recognised was the criticality of KM strategy for KM initiatives success (Bartczak & England, 2005: 107 and later the USA Field Manual 6-01.1., 2012). In fact, the USA DOD Joint Vision 2020 focuses on achieving information and knowledge superiority, stating that - "…information superiority provides the joint force a competitive advantage only when

[57] USA Air Force Material Command employs approximately 85 000 military and civilian personnel (this is roughly the entire SA DOD permanent force strength).

[information] is effectively translated into superior knowledge and decisions." (USA DOD, 2000: 11 in Marshall, 2007: 12). This vision of information and/or knowledge superiority as a prerequisite for military advantage is also articulated in the 2008 USAF ISR strategy (USA, 2008) and by Manuri and Yaacob (2011). "[K]nowledge superiority depends on qualitative differentials: identifying the specific target and directing the right matter to the right space at the right time within the opponent's observe-orient-decide-act (OODA) loop" (USA, 2008: 17). This statement links knowledge superiority to the 'who-what-where-when-how-which effects–what thereafter' characterisations of knowledge and the importance of the OODA loop as a knowledge process.

What is noticeable in the 2008 USAF ISR Strategy is the constant reference to the information age and not the knowledge era – "We now live in the information age." (USA, 2008: 7). Yet, with the acknowledgement that knowledge is the fourth pillar and the driver of advantage, the world crossed over into the knowledge era. A key expression driving KM in the USA military is found in the 2008 USAF ISR Strategy -

> *"Knowledge is now the "fuel", the fundamental prerequisite for success."* (USA, 2008: 8).

The USA Air Force Material Command initial KM effort was based on commercial KM processes and understanding, consisting of a number of smaller applications that provided access to Defence Acquisition related knowledge, a lesson learned programme, a Community of Practice (CoP) programme and some online training and education facilities. What is critical to note from the early experiences of initiating a USA military KM programme (circa 1998) are that the programme had an appointed champion (leadership) and it was funded (resourced) for development – two KM CSF identified in chapter 2 of the dissertation. The very early USA KM programme definition was – "…to enhance organizational performance by explicitly designing and implementing tools, processes, system, structures, and cultures to improve the creation, sharing, and use of knowledge that was critical for decision-making". The focus was on knowledge identification, capturing and leveraging as core KM processes. (Bartczak & England, 2005: 107).

Key issues that hampered KM success were associated with different levels of commitment to KM by the leadership echelon; friction due to organisational mandates for the management of certain IT and application between the IT organisation and the USA Air Force Knowledge Management component; competition for funding; a requirement for performance measurement to support bids for continued and more funding; a poor understanding of KM and its potential and benefits by the organisation (the Malaysia Air Force grappled with the same problem - Manuri and Yaacob, 2011); what would be the optimum branding of the initiative so as to support status, leadership and funding requirements (Bartczak, 2002; Bartczak & England, 2005 and Marshal, 2007). These issues closely correspond to discussions about KM CSF in Chapter 2 of the dissertation. Other issues voiced as barriers to KM initiatives from other foreign militaries are knowledge being managed in silos and lack of KM awareness and understanding (Malaysia Air Force – Manuri & Yaacob, 2011).

Adkins, Bartczak, Griffin and Downey (2010) write on the progress made and lessons learned from the USA Air Force Knowledge Now programme, as a continuation of KM development in the USAF. The USAF Knowledge Now's definition of KM is "…a systematic process of identifying, capturing, and transferring personal practices, experiences, and expertise that can be used to

enhance performance or improve related tasks or processes" (Hague & Verma, 2008: 12). The USAF Knowledge Now continuously evolves to meet the USAF requirements for knowledge sharing and learning. The USA Air Force Knowledge Now also became the host for the Financial Management Knowledge Management programme (Hague & Verma, 2008).

The USA Navy Knowledge Online soon followed the establishment of the USA Air Force Knowledge Management (Manuri & Yaacob, 2011). The Malaysian Air Force has similar KM platforms as the USA Air Force Knowledge Now, USA Navy Knowledge Online and USA Army Knowledge Online (Manuri & Yaacob, 2011). Adkins, Bartczak, Griffin and Downey (2010) summarise seven key lessons learned from the USA Air Force Knowledge Now programme as -

- Decentralised approach. Knowledge management initiatives benefitted immensely from a decentralised approach to implementation and use of KM. The USA Air Force Knowledge Now only provides the information systems platform, tools and overarching governance centrally which was named the Air Force Centre of Excellence for Knowledge Management. The content shared is managed by the users. This developed in an open, flexible and non-hierarchical environment for knowledge sharing, learning and innovation.
- User-friendly. The system was designed for ease of use. Simplicity and adaptability to new requirements and operational situations were key drivers for growth in user numbers.
- Assistance. A help desk function proved to be extremely useful to get users started and keeping users connected, which are important for knowledge sharing. The fact that this help desk is staffed by people with experience made it very successful.
- Access. Ubiquitous access to the USA Air Force Knowledge Now system soon became a requirement for programme success. Knowledge flow does not want to be hampered by geography, time differences or organisational structure or culture.
- Reliability. Confidence in the IT systems used. Users must be familiar with these systems and have confidence in their prolonged availability.
- Reward and recognition. Contribution to the USA Air Force Knowledge Now is rewarded and recognition is given to important contributions.
- Self-propagating. The user-base will grow by word-of-mouth if the experience using the system is satisfactory.

The evolution and growth of a KM initiative are important to remain relevant in complex military environments. If there are requirements for organisations to evolve in response to complexity, then the management processes should be flexible and adaptive to co-evolve. Therefore, if the suite of KM processes is too prescriptive, the organisation might soon find itself out of sync with environmental requirements for new meaning or have knowledge processes (such as the OODA loop) that are reactive rather than pro-active or ahead of the curve.

Degen (2008) writes from a USA Army perspective on USA KM imperatives for the management of USA military doctrine. Degen (2008: 106) provides an explanation of the USA military knowledge categories or types of knowledge to be managed and how these fit the organisation's strategy and/or operations. Figure 3.2 provides a synopsis of categories or types of military knowledge to be managed from a USA military perspective. This can be applied in general to all militaries with varying degrees of complexity. These are thus adopted for the purpose of this

research. However, the researcher would like to restrict the discussion and analysis in later chapters to policy, doctrine, IP and intelligence. This research would like to focus on capstone military knowledge that is at the strategic level and provide strategic direction to the organisation. Other knowledge considered as capstone military knowledge is closely related to execution but based on policy, doctrine and intelligence. Intellectual Property, on the other hand, is considered capstone knowledge because it confers advantage if controlled, owned and used. Subsequent research on SA DOD knowledge, and based on a knowledge audit, can possibly consider analysing the complete portfolio of knowledge discovered.

Influencing factors that will alter the use of some of the KM tools mentioned is organisational culture and security arrangements. Initially, the type of knowledge managed by the USA Air Force Material Command was business function related laws, directives, policy, regulations and online courses. (Bartczak & England, 2005: 109). Knowledge management is posited as the enabler to manage military doctrine with. Military doctrine is equated to capstone military knowledge – at least when it comes to force generation and operations.

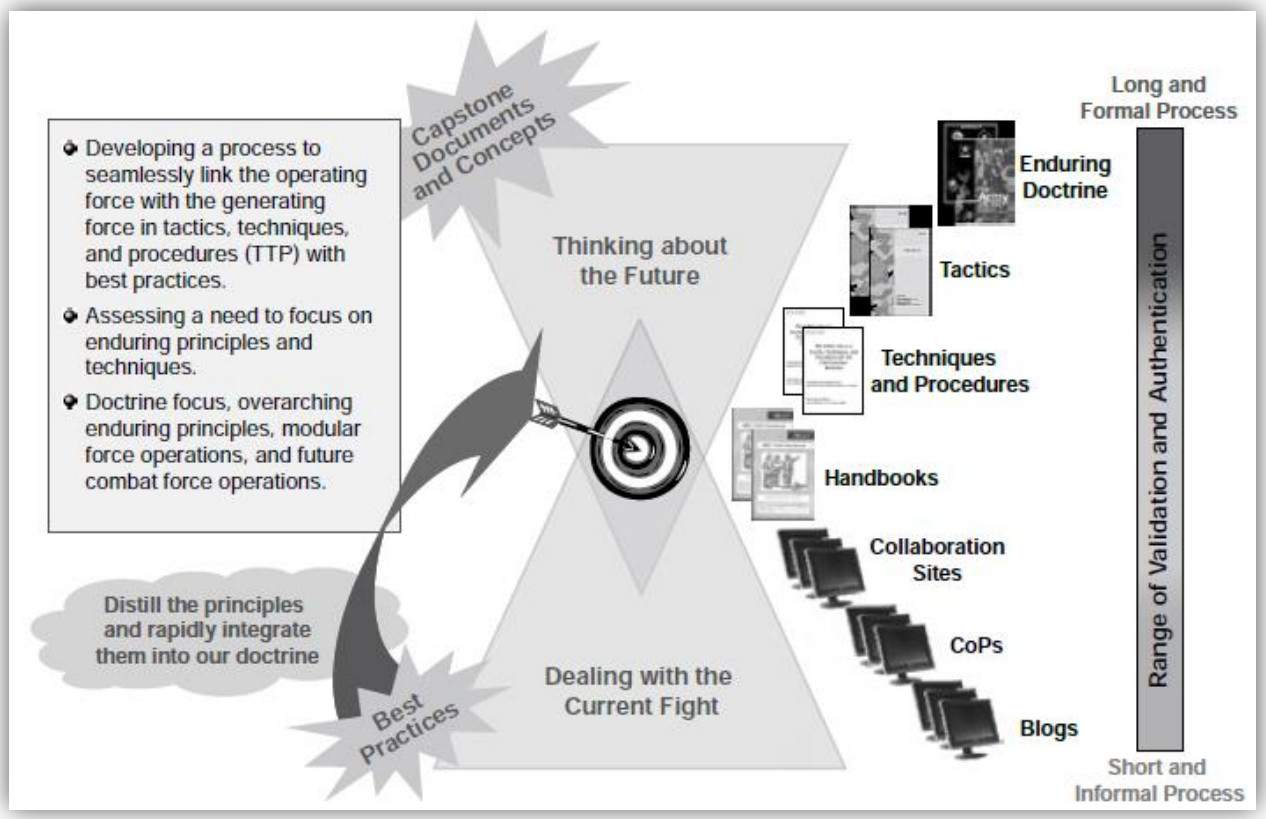


Figure 3.2: USA Military Knowledge Management Systems Approach

Source: Degen (2008: 106).

Although the diagram (Figure 3.2) is not a formal USA military KM model or system; it provides a synopsis of the capstone military knowledge requiring management (doctrine, tactics, techniques and procedures), sources and knowledge (organisational documents, handbooks) and KM tools for sharing and learning (e.g. community of interest/purpose/practice, collaboration sites and blogs) and some of the KM tools available to KM processes (typically knowledge sharing and learning) as enablers to mission command, military advantage and effects (e.g. knowledge

superiority). Interestingly, policy, strategy and intelligence are not explicitly stated as capstone military knowledge but can be interpreted as being part of "Capstone Documents and Concepts". Because of international militaries organisational similarity, this synopsis contributes to answering SRQs 3 and 4.

Degen (2008: 103) describes the evolutionary process that shaped USA doctrine over a period of more than a century. Degen (2008: 102) constantly refers to Field Manual (FM) 1 (The Army) and FM 3.0 (Operations) which describe doctrine as - "… a body of thought on how [USA] Army forces intend to operate as an integral part of a joint force. Doctrine focusses on how to think – not what to think.". Interestingly, the definition does not refer to a 'body of knowledge' but rather a "body of thought", essentially equating knowledge to thought or how to think. Thinking is a process embarked on to create awareness, clarity, learning, sense, understanding and meaning in order to make decisions to act or not. USA Joint Publication 1-02 (Department of Defence Dictionary of Military and Associated Terms, 2001: 165 and not page 169 as published by Degen, 2008) is quoted by Degen (2008: 103), defining doctrine as the - "… fundamental principles by which the military forces of elements thereof guide their actions in support of national objectives". This definition distinctly links knowledge (in the form of doctrine) to action and the achievement of higher level objectives. This is important when attempting to construct a KMC for an organisation. In terms of the USA Army, those higher level objectives are articulated in the USA National Security Strategy and National Military Strategy (Degen, 2008: 105), amongst others.

The SA DOD has a very similar arrangement, RSA National Security Strategy and SA DOD Military Strategy, striving towards the achievement of national security objectives through decision-making and action to achieve some desirable effects and advantage. These objectives should be linked to a future SA DOD KMC to ensure the alignments of strategic vision and other strategic outcomes. When it is accomplished it will set the tone for integrated and coherent SA DOD KM. Today, KM is a recognised and critical military capability and component of USA military advantage, linked to USA national security (Marshal, 2007 and USA, 2008). Views from the USA Army KM Field Manual (USA FM6-01.1., 2012) [58] will now be discussed as the leading USA KM doctrine.

3.4.2 USA Army Knowledge Management Doctrine

USA military KM did not originate in the USA Army. The USA Army adopted KM as a discipline in 2003. (USA FM6-01.1.) However, by 2011 the USA Army was leading the USA military KM initiative (Barquin, 2011).

The USA Army defined KM as - "… a discipline that promotes an integrated approach to identifying, retrieving, evaluating, and sharing an enterprise's tacit and explicit knowledge assets to meet mission objectives." (Barquin, 2011: online). This definition resonates with earlier definitions by the USA Air Force Material Command. These processes and activities are also associated with

[58] "This publication supersedes FM 6-01.1, dated 29 August 2008. This manual provides doctrinal knowledge management (KM) guidance. It provides doctrine for the organization and operations of the KM section, and establishes the doctrinal principles, tactics, techniques, and procedures necessary to effectively integrate KM into the operations of brigades and higher. This manual and its successors are intended to provide the guidance on how to use KM successfully to benefit Soldiers at the tip of the spear as well as commanders and staff, in present and future operational environments, in an era of persistent conflict." (USA FM6-01.1., 2012: iii-iv)

other management disciplines such as data and information management as well as intelligence formulation. However, the KM definition above aims at applying the said processes and activities to knowledge, which is closely related to IC as discussed in Chapter 2 of the dissertation –

> "… [tacit knowledge is the] personal store of knowledge gained from life experience, training [human capital], and formal and informal networks of friends and professional acquaintances [relation capital]… explicit knowledge include dictionaries, official department publications (field manuals, technical manuals, tactics, techniques, and procedural manuals,…pamphlets) and memorandums [structural capital]" (USA FM6-01.1., 2012: 1-2)

Definitional issues are discussed in more detail later in this chapter. The USA Army sets out to achieve KM with the USA military doctrine on Knowledge Management Operations - USA FM6-01.1. (2012). As such, the USA Army Headquarters (HQ) currently sets the tone for USA military KM with the USA FM6-01.1. (2012) dictating capstone KM doctrine. Since the publication of the USA FM6-01.1. (2012) version, the USA Army committed to the implementation of KM to the lowest organisational level. (Mortensen, 2014: 7) Concisely stating the USA military KM objective, but also providing insight as to the molecular level (down to the individual person) KM has to permeate the USA military, the USA military KM doctrine states –

> *"Every soldier must understand and practice KM"* (USA FM6-01.1., 2012: 1-1)

To this end, the USA Army HQ established an Army Operational KM Proponent (USA FM6-01.1. (2012: iii). The FM6-01.1. (2012) describes KM doctrine, tactics, techniques and procedures for USA Army Brigades and higher. Because of comparative sizes and levels of complexity, the document provides very good insight into requirements for SA DOD KM.

The 2008 USAF ISR Strategy defines knowledge as - "The awareness of what is operationally relevant in the conflict space" (USA USAF ISR, 2008: 17). The definition is very restricted in the sense that it only really refers to tacit knowledge, 'awareness' being a human phenomenon. Explicit knowledge such a doctrine, policy, strategy, tactics, techniques and procedures informs this awareness and are possibly products of such awareness to a large extent. Years later the USA Army KM doctrine defines knowledge as -

> "…information that has been analyzed to provide meaning or value or evaluated as to implication for the operation. It is also comprehension [understanding] gained through study, experience, practice, and human interaction that provides the basis for expertise and skilled judgement. Knowledge results from analysis of information and data. Individuals gain knowledge when they place information in context based on what they already know, available factual information, and their judgement and experience. This leads to understanding." (USA FM6-01.1., 2012: 1-2)[59].

The definition equates knowledge to meaningful information resulting from a number of sources and processes in order to 'understand'. This relates well to the structural capital of organisations. What is problematic about the definition is that it equates knowledge to information and not directly to 'meaning'. Not all analysed information will result in meaning. This 'meaning' must provide some value proposition; however, the definition does not elaborate on this. The

[59] See footnote 53.

definition stops short of providing the user with a precise indication why this 'meaning' is required – for example, to facilitate enhanced decision-making, actionable, decision-quality intelligence or knowledge, action and effects. When considering the first definition, the 'meaning' and subsequent 'understanding' will probably result in 'awareness' – also evident in the diagram of the OODA loop below (Torruella, date unknown: slide 8). The second part of the definition addresses tacit knowledge inherent in people, (human capital) and possibly relational capital (knowledge from human interaction). This is not restricted to the military but is a generic assessment of knowledge.

From the USA FM6-01.1. (2012) description of knowledge, both tacit and explicit knowledge are acknowledged and separately addressed as types of knowledge; corresponding to the theory surrounding these types of knowledge as discussed in the epistemology of knowledge in chapter 2 of the dissertation. The definition also addresses the construct of IC broadly. The USA FM6-01.1. (2012: 1-12) posits the dimension volumes of tacit vs. explicit in Figure 3.3. This slightly contradicts the position of a 30-70% split posited by Weeks (2016) in Figure 2.3.

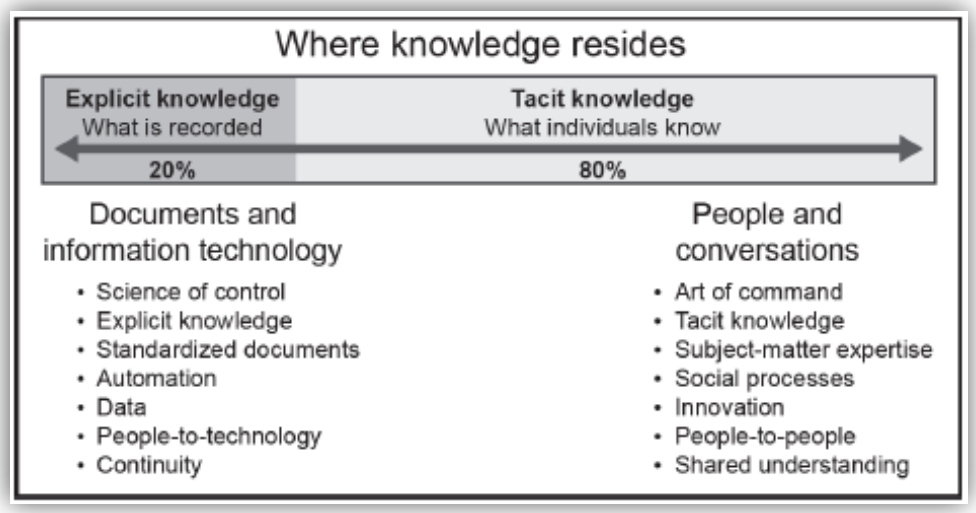


Figure 3.3: USA Army Perception of Knowledge Type Volumes

Source: USA FM6-01.1. (2012: 1-12).

What is important in terms of answering SRQs 3 and 4 is the examples of (USA) military knowledge mentioned by the USA FM6-01.1. (2012: 1-2) – "… [tacit knowledge is the] personal store of knowledge gained from life experience, training [human capital], and formal and informal networks of friends and professional acquaintances [relation capital]… explicit knowledge include [*sic*] dictionaries, official department publications (field manuals, technical manuals, tactics, techniques, and procedural manuals,…pamphlets) and memorandums [structural capital]"; a view supported by Bartczak and England (2005: 109) and Manuri and Yaacob (2011: 74). Although the USA FM6-01.1. (2012) provides some indication as to what is perceived as knowledge and types of knowledge it is by no means an exhaustive list. Hague and Verma (2008: 12) add - "… rules, regulations, guidelines, and directives". Manuri and Yaacob (2011: 74) add - "… doctrine, policies and procedures, operations and training manuals, information systems, work flow [*sic*] and databases". Lungu (2011: 119) adds - "… processes, routines and norms" to the mix. Interestingly enough, no mention is made of various strategy documents, regulations and legislation as examples that inform the creation and maintenance of the above-mentioned types of explicit knowledge but

also how tacit knowledge might be generated and shared. Another example that might be considered is training curricula, critical to learning organisations. These are all examples of structural capital. It also illustrates the usefulness of broader constructs such as human-, structural-, and relational capital in definitions rather than specific processes or artefacts.

As a published example of explicit military knowledge; Paparone (2008) writes on the USA military logistics knowledge and provide an integrated model of military logistics knowledge from a USA Army Logistics perspective. The model detail military logistics subject matter which could be refined to provide a sense of knowledge categories which should be considered for management within other military functional areas, e.g. personnel, finance, acquisition, research and development, policy and strategy, etc. – see Figure 3.4. From a definitional perspective, these can be categorised according to the IC construct.

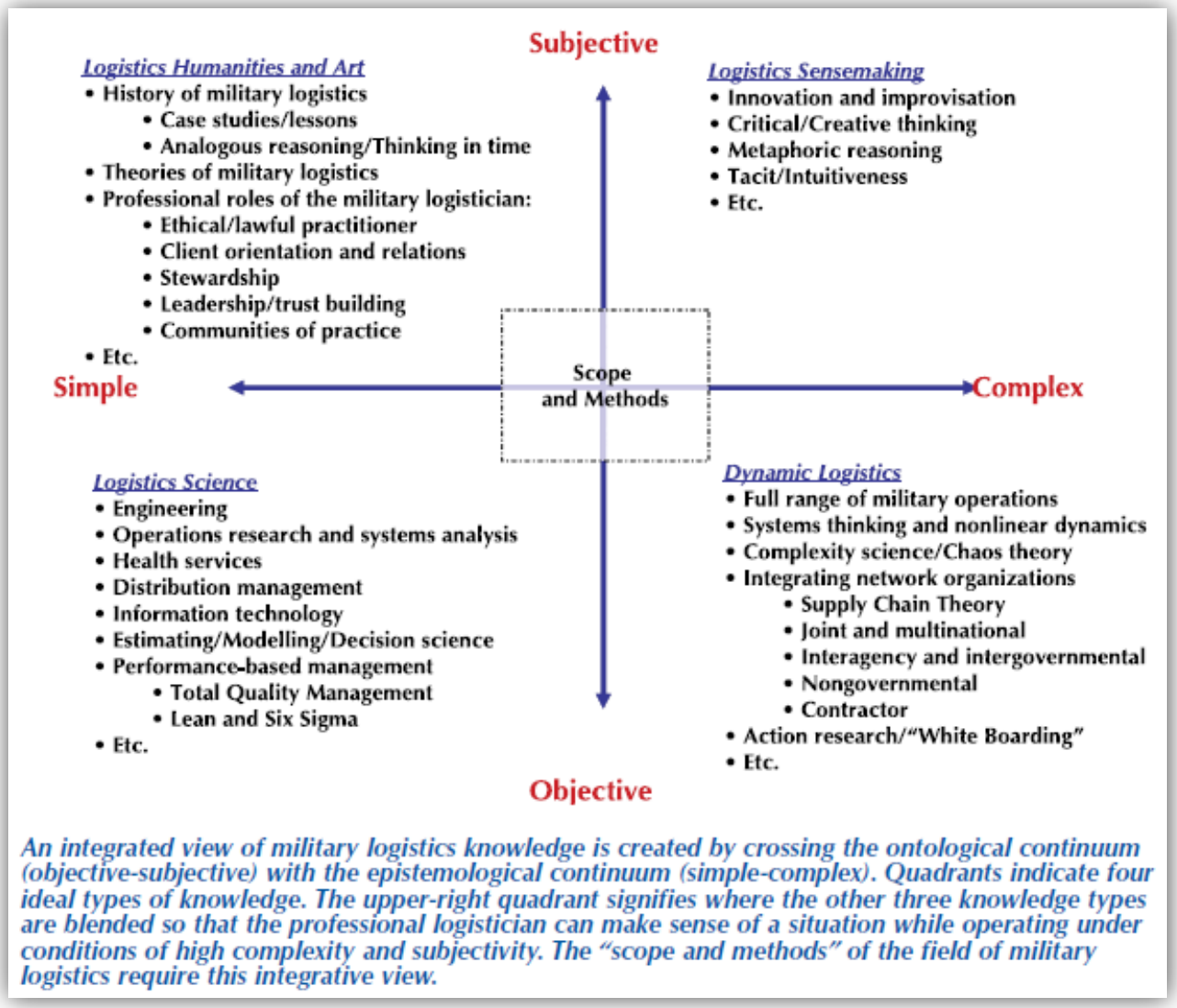


Figure 3.4: USA Army Logistics

Source: Paparone (2008: 40).

Lungu's description of logistics knowledge is slightly more practical than that of Paparone (2008). Lungu (2011: 118) contributing from a North Atlantic Treaty Organisational perspective, describes at least three military logistics knowledge domains, i.e.:

- production/acquisition logistics knowledge: "… knowledge related to research, design, development, manufacture and acceptance of materiel, which includes standardisation and interoperability, contracting, quality assurance, procurement of spares, reliability and defence analysis, safety standards for equipment, specifications and production processes, trials and testing (including provision of necessary facilities), codification, equipment documentation, configuration control and modifications". Several of these fall within the domain of IP, which is capstone military knowledge.
- in-service logistics knowledge: "… knowledge associated with procuring, receiving, storing, distributing and disposing of materiel, which is required to maintain the equipment and supply the force".
- consumer/operational logistics knowledge: "… knowledge concerning the reception of the initial product, storage, transport, maintenance (including repair and serviceability), operation and disposal of materiel, that includes stock control, provision or construction of facilities, movement control, reliability and defect reporting, safety standards for storage, transport and handling, and related training".

The snapshot explanation of Lungu (2011) above provides a comprehensive view of the vastness of a singular military knowledge domain. Consider the vastness of an entire military force such as the USA military if the operational functions of a military are considered to be C2, intelligence, fires, movement and manoeuvre, protection and sustainment.

The USA Joint Doctrine Publications identify the operational functions as personnel, intelligence, operations, logistics, plans and communications systems (JP 3-0, 2011: v). These functional areas closely resembles the Continental Staff System adopted by the North Atlantic Treaty Organisational countries, to have the following nine Joint-functions: J-1: personnel and health; J-2: intelligence and security; J-3: operations; J-4: logistics; J-5: plans; J-6: signal and communications; J-7: training and coordination; J-8: continuous improvements; and J-9: finance and contracts. (Logavatu, 2015: online) There are a number of variations of the composition of the J-1 to J-9 staff functions but in essence, all addressing the same. These can all be considered key knowledge domains for militaries; in conjunction with the operational functions are a boundless amount of knowledge and knowledge types. With this in mind, one could appreciate the complexity of knowledge and knowledge system requirements to manage this volume of knowledge, coherently and in an integrated manner.

Thus, the researcher proposes to move away from listing types of knowledge in the definition of knowledge. Also, the definition of knowledge should not make reference to 'knowledge is information' – because it is not. The researcher proposes that knowledge is new and evolving meaning stemming from KM processes, in the form of intellectual capital, in order to understand, make decisions, act or not, create the desired effects and obtain and sustain advantage.

USA FM6-01.1. (2012: 1-1) defines KM as – "… the process of enabling knowledge flow to enhance shared understanding, learning, and decisionmaking [sic].". This definition is simplified

by KM defined as - "Know, Show, Grow!" Know = tacit "head knowledge"; Show = knowledge that is written down and documented (explicit knowledge) to be shared with others; Grow = collaboration towards innovation which sparks new knowledge". (USA FM6-01.1., 2012: iv) Another definition of USA Army KM taken from USA Army Regulation 25-1 (USA AR 25-1, 2008)[60] is - "… a discipline that promotes an integrated approach to identifying, retrieving, evaluating, and sharing an enterprise's tacit and explicit knowledge assets to meet mission objectives" (Barquin, 2011, online).

Although there are some elements of the definitions (FM06-01.1. and AR 25-1) that are similar, the FM6-01.1.-definition is much less prescriptive regarding the processes to be followed and also deals with the concept of knowledge holistically (rather than splitting it up in explicit and tacit). The USA AR 52-1.-definition is less clear about the KM objective, only coupling it to 'mission objectives'; whereas the first definition elaborates more on generic objectives that have an organisation wide applicability (e.g. enhanced decision-making and understanding). These definitions show clearly that the USA military is also still wrestling with coherence issues.

The USA FM6-01.1. (2012: 1-1) KM definition is simplistic and clearly based on the work of various academics as discussed earlier under the epistemology of knowledge and KM. Zhang (2013: 18) defined KM as "KM = $(P + K)^{S}$" – P (people), K (knowledge) and S (sharing) - as discussed earlier in the dissertation. Defining KM in such a simplistic manner is useful for organisations because it is easy to remember and to create a management mantra from it. However, this should be supplemented with detailed description to ensure comprehensive understanding and coherence.

[60] This publication has since been revised and is now called AR 25-1 (Army Information Technology (25 June 2013).

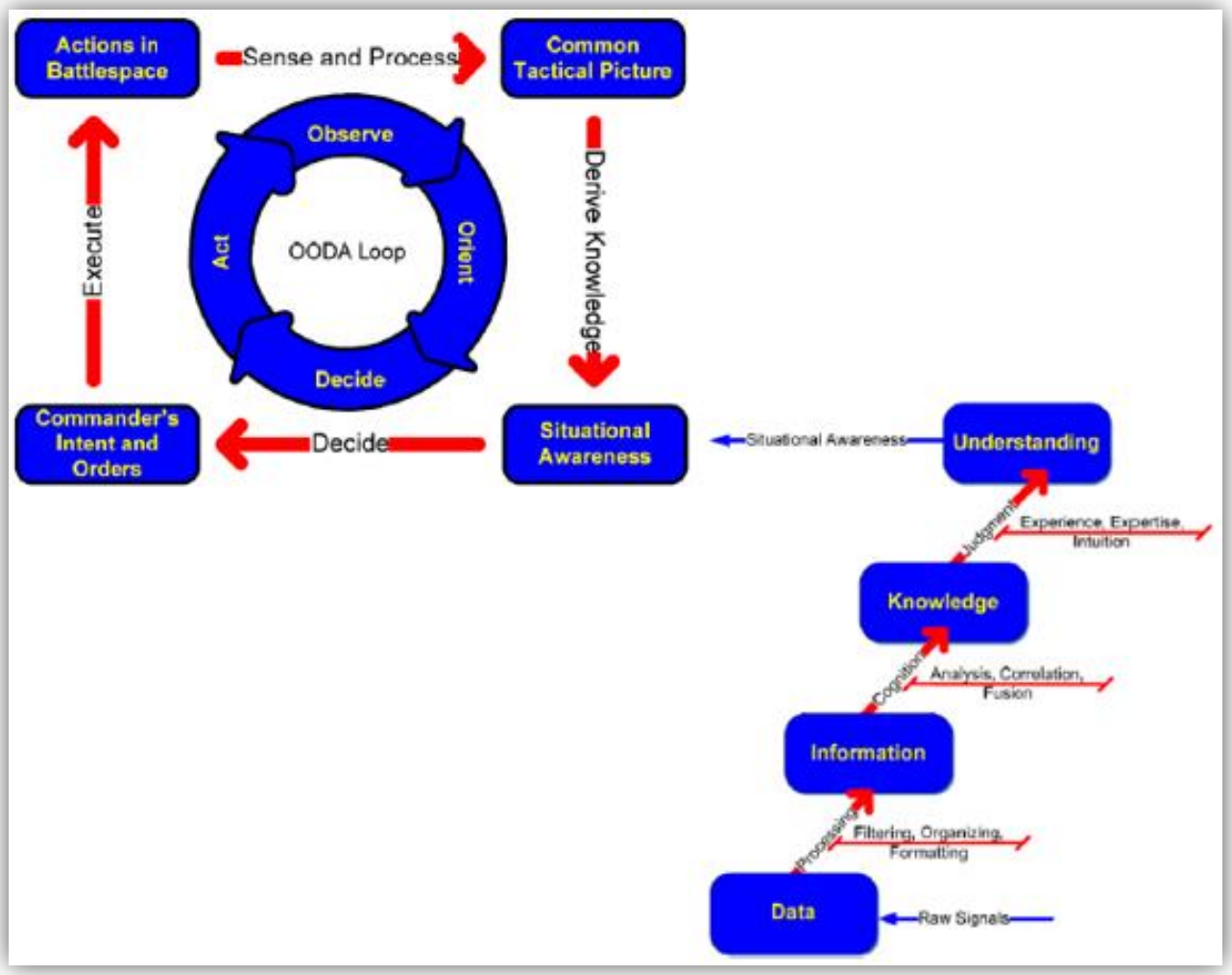


Figure 3.5: OODA Loop vs Knowledge Pyramid

Source: Torruella (date unknown: slide 8).

Key acknowledgement is the existence of both tacit and explicit knowledge, a process to convert or extract tacit knowledge and makes it explicit, processes to share knowledge for use during collaboration and the requirement to continuously generate new knowledge (which is consistent with the principles of the OODA loop discussed earlier as well as objectives of learning organisations).

Torruella (USA DOD presentation) utilises the OODA loop to depict the link between knowledge and understanding, decision-making and action in Figure 3.5. The role of knowledge is even more evident from an Effects-Based Operations perspective, as briefly discussed in the literary review (dissertation Chapter 2), based on the ideas of Deptula (2001) in Batschelet (2002: 3) – see Figure 2.6. Knowledge is clearly linked to action and achieving specific effects.

The USA FM6-01.1. (2012: 1-11) takes the knowledge hierarchy one step further by considering wisdom to be the pinnacle of knowing (Torruella used 'understanding' as the pinnacle, which is probably more practical considering the shortages in wisdom). What is problematic about Figure 3.6 is the fact that decision-making is distinctly linked to wisdom, which is a very scarce state of being. Literature prescribes knowledge as the advantage driver, not wisdom – probably in

recognition of the scarcity of wisdom. Also, shared understanding assumes coherence and integration.

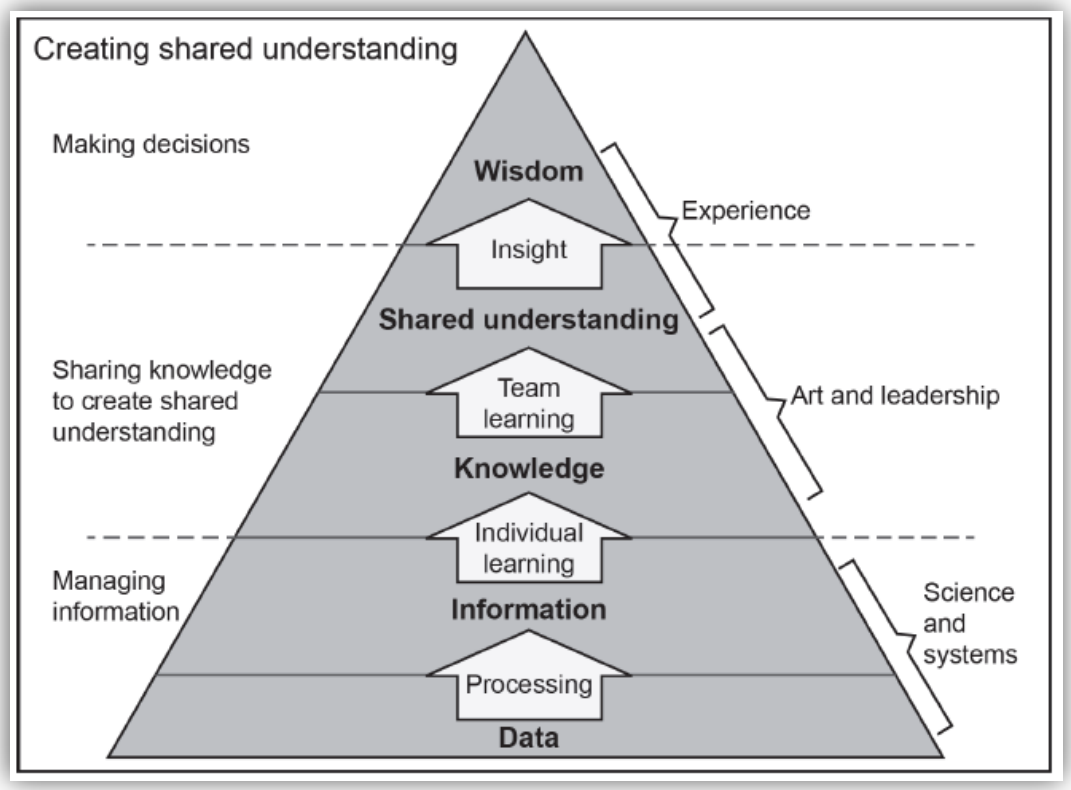


Figure 3.6: Creating Shared Understanding

Source: USA FM6-01.1. (2012: 1-11). Also found in discussion in Bennet, Bennet and Lee (2010: 317) citing Ackoff (1989) and Davenport and Prusak (1998). However, Bennet, Bennet and Lee (2010) posit that this hierarchy is not a continuum but rather a guide to comprehending how understanding and meaning come about.

Two other important aspects of Figure 3.6 is the art of leadership and science and systems. From a mission command perspective, this is the art of command and the science of control. From a KM perspective, the researcher proposes – the art of knowing[61] and the science of managing knowledge to obtain and sustain advantage - as the KM leadership philosophy.

The researcher is of the opinion, based on the literature review (dissertation Chapter 2), that the USA FM6-01.1. (2012: 1-1) addresses the crux of KM. However, the definition could possibly be expanded with objectives that address action and effects. McIntyre, Gauvin and Waruszynski, (2003) in Manuri and Yaacob (2011: 74) are of the opinion that - "Military KM will play a valuable role in leveraging existing knowledge and converting new knowledge into action through the KM cycle".

[61] The art of knowing is not a novel construct. Duguid (2005) used the phrase 'the art of knowing' in his chapter heading in which he wrote about the practicalities and realities of communities of practice as a method of knowledge sharing and creation. Another author, Code (2011), use the phrase in the title of his article that explores the epistemology of knowing and how it relates to constructs such as imagination, science and art and implications for education.

A military effect is an operational concept used by militaries worldwide and emanates from Effects-Based Operations[62] doctrine. FM6-01.1. (2012) graphically explains that KM enables enhanced decision-making in Figure 3.7 –

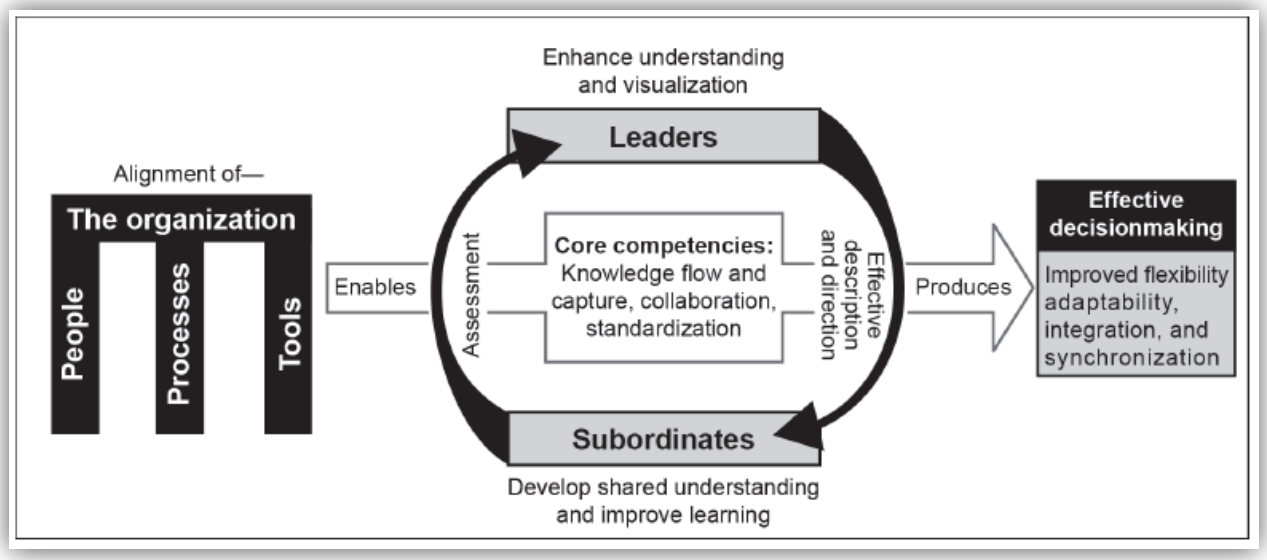


Figure 3.7: Enhancing Decisions with Knowledge Management

Source: USA FM6-01.1. (2012: 1-9), also in Figure 3.9.

The objective of KM is to - "… create shared understanding [mission command principle] through the alignment of people, processes, and tools within the organizational structure and culture [USA Army KM model] in order to increase collaboration and interaction between leaders and subordinates" (USA FM6-01.1., 2012: 1-1) and KM - "… seeks to enhance shared understanding and decisionmaking [sic] by creating knowledge, organizing knowledge, applying knowledge, and transferring knowledge" (USA FM6-01.1., 2012: 1-2) – a KM process perspective.

Stated more concisely, KM - "…creates, organizes, applies, and transfers knowledge and information between authorized people." (USA FM6-01.1., 2012: iv). This provides the first clear indication that KM has a security component – a process and requirement not highlighted by literature as discussed in chapter 2 of the dissertation. Also, clearly recognise the existence of knowledge and information and that both get transferred by KM process. The projected results are improved decision-making, flexibility, adaptability, integration, and synchronisation for the achievement of advantage (USA FM6-01.1., 2012: 1-1).

The 2008 USAF ISR Strategy states - "… actionable intelligence" (USA: 2008: 4 & 8), "… decision-quality intelligence" (USA: 2008: 14) and - "… actionable knowledge" (USA: 2008: 9 & 16) as products of KM. This is important because it separates the constructs of knowledge and

[62] McIntyre, Gauvin and Waruszynski (2003) writes for the military environment and specifically from the perspective of the concept of a Revolution in Military Affairs. Included in this concept is effects-based warfare (EBW), which could be applied to the management sciences – i.e. effects-based management. These are important concepts for Defence, specifically to provide the right resources, at the right place and time, at the right force level – to create the right effect (notions raised by March, 2005: 1) Defence KM should be managed along these lines – i.e. to create the right effect in support of force development and deployment. Hildebrand (1999), from an information processing perspective, dispels this notion off "right" as a myth – and should therefore be interrogated to ensure that the philosophy of KM is based on the right assumption(s).

intelligence and links both to a specific quality. Intelligence[63] is regarded as capstone military knowledge, required for decisions and actions and a requirement to create effects and advantage or to confirm certain effects and/or advantage has been achieved. Thus, intelligence is tailored for end-use and thus very context and time specific – conforming more to what knowledge is perceived as.

The USA FM6-01.1. (2012:1-3) lists that the main USA military KM components as people, processes, tools and organisation (see Figure 3.7 and 3.9), which closely correspond to the construct of IC explained in the literature review (dissertation Chapter 2). The Army Knowledge Management (AKM) (2008) categorise these as people/culture, process, and technology (a view supported by Manuri and Yaacob, 2011). The USA FM6-01.1. further recognises that KM is more than IT and communication technology management. These components resonate well with several other KM models as discussed in the literature review (dissertation chapter 2).

An important statement made by the USA FM6-01.1. (2012) is that people are vital for KM success – with a clear recognition that both internally employed people, as well as people external to the organisation with stakeholdership (i.e. people within other government departments, agencies, institutes, and even private organisations), are included. This perspective finds grounding in the 2008 USAF ISR Strategy state requirement - "… teams of humans to produce actionable intelligence" (USA, 2008: 8) – noting the opinion about KM and intelligence in footnote 63. These perspectives, again, highlight integration as a pre-requisite for KM success. Manuri and Yaacob (2011: 78) articulate this as -"Conceptually, the KM in military is about connecting those who know with those who need to know ('who-what-where-when') and leveraging that knowledge across the military organisation and to contractors, non-governmental organisations, the other military services and coalition partners.". It presents a strong case for the inclusion or recognition of other stakeholders in an organisational or military KM model, acknowledging that military knowledge might be external to the military organisation. It also provides strong support for relational capital as a vital part of military KM.

Another component included in the people component of KM is leadership and its importance, discussed below more specifically in terms of the role of the CKO and highlighted earlier as an initial barrier to the first USA military KM initiatives and discussed as part of mission command as a military construct. The 2008 USAF ISR Strategy calls for "Multi-dimensional Leaders … the ability to lead teams to create knowledge" (USA, 2008: 9).

When considering KM principles, the USA Army has two perspectives on the matter. The USA FM6-01.1. (2012: 5-6) and Mortensen (2014: 11) describe six KM principles. Barquin (2011) - based on USA AR 25-1 and Manuri and Yaacob (2011) – based on Army Knowledge Management (AKM) (2008) describes 12 KM principles (also contained in a KM model by Neilson (unknown: slide 3). Consider the following table:

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[63] McIntyre, Gauvin and Waruszynski (2003: 39) writes from a Canadian military perspective that – "Similarly, battlefield intelligence requires KM that is accurate and timely to "determine enemy or potential enemy force composition, position, capabilities and intentions; while reducing the potential for strategic, operational, tactical, or technological surprise." [22] The intelligence cycle is a four-step process for obtaining, assembling and evaluating information, converting it into intelligence and disseminating it. The first phase, direction, is when commanders determine the requirements, communicate them to staff who in turn collect existing material and request collection from other sources. The second phase, collection, occurs when reconnaissance and surveillance data is gathered by sources and agencies. The third, processing, phase involves the collation, evaluation, analysis, integration and assessment of the gathered information. This phase is the conversion of information into intelligence. In the final, dissemination, phase intelligence is distributed to those who require it."

Table 3.1: USA Military Knowledge Management Principles

USA FM6-01.1. (2012: 5-6) and Mortensen (2014: 11)	Barquin (2011) - based on USA AR 25-1[64] Manuri and Yaacob (2011) – based on AKM (2008)
"Understand - Shared understanding across, between, and through Soldiers/leaders and organizations is the desired objective. Share - Knowledge is a transferable asset which tends to grow with use and application. KM helps the Army to acquire and share knowledge in support of the operational objectives. Integrate - KM breaks down stovepipes and enhances situational understanding. Connect - KM focuses on transferring tacit knowledge between individuals, teams, and units through collaboration. Learn - KM fosters individual and collective learning and contributes to developing learning organizations by integrating informal learning, organizational learning strategies, and KM capabilities. Trust - Successful KM depends on willingness to share knowledge so that others can benefit. This sharing contributes to building an environment of trust and mutual understanding.".	People/Culture Dimension Principle 1: Train and educate KM leaders, managers, and champions. Principle 2: Reward knowledge sharing and make knowledge management career rewarding. Principle 3: Establish a doctrine of collaboration. Principle 4: Use every interaction, whether face-to-face or virtual, as an opportunity to acquire and share knowledge. Principle 5: Prevent knowledge loss. Process Dimension Principle 6: Protect and secure information and knowledge assets. Principle 7: Embed knowledge assets (links, podcasts, videos, documents, simulations, wikis ...) in standard business processes and provide access to those who need to know. Principle 8: Use legal and standard business rules and processes across the enterprise. Technology Dimension Principle 9: Use standardized collaborative toolsets. Principle 10: Use Open Architectures to permit access and searching across boundaries. Principle 11: Use a robust search capability to access contextual knowledge and store content for discovery. Principle 12: Use portals that permit single sign-on and authentication across the global enterprise including partners.

Adapted from the stated sources in the first line of the table.

Although there is a considerable overlap between the sets of principles there are some principles that are standalone. One such principle is - "Principle 6: Protect and secure information and knowledge assets". Again, acknowledging the importance of both constructs to KM.

Principle 6 is a principle or process that is not commonly articulated by academics, authors or practitioners. It is probably not a very favoured principle among knowledge managers because it inhibits knowledge sharing and flow and thus knowledge growth and innovation. However, knowledge security as a principal and/or process is extremely important for KM capabilities for the obvious reason that if knowledge is not secured for authorised usage the organisation could lose it or lose the advantage attached to it when it becomes public/opponent knowledge. These issues are addressed in the military by organisational components dealing with information security and counter-intelligence. It could be quite possibly the result of the obvious requirement for knowledge security and the common practice of information security that knowledge security is not written about.

[64] The father of the 12 Army KM principles was Dr R.E. Neilson; the first Knowledge Management Advisor to the Army's Governance, Acquisition & Chief Knowledge Office (Barquin, 2011).

Because KM is a relatively new phenomenon, militaries must integrate organisational policy and doctrine dealing with data, information, IM, information security, intelligence and counter-intelligence, IT, communication and associated technology, knowledge and KM – in order to successfully employ KM enterprise-wide. Organisations will thus have to make a concerted effort to balance requirements for knowledge sharing with that of knowledge security. The objective of this balancing would be to connect people who know with people who need to know, in a secure manner in support of the mission command principle of creating shared understanding. The nexus is; share and then secure or secure and then share?

3.4.3 USA Knowledge Management Challenges

Weeks (2016: slide 5) lists a number of USA Army KM challenges. These are - disparate systems and repositories; stovepipes in systems and operations; inefficient, redundant processes and procedures and loss of knowledge. The redundancy of KM processes and procedures is an indication that KM definitions and management models should not be based solely on KM processes. This tends to limit flexibility, adaptability and responsiveness to changes in the environment. KM is about 'dynamic human processes' that facilitate understanding and new meaning.

Organisational knowledge loss has much less to do with security than it has to do with HRM (resignations, death, poaching, churn, retirements, etc.). These affect access to the tacit knowledge of individuals, which consists of 70% of the organisational knowledge, according to Weeks (2016: slide 7). These issues are addressed separately in the USA Army KM model (Figure 3.9).

In order to mitigate the inherent risk stemming from the challenges above, Weeks (2016: slide 5) suggests the use of enterprise solutions (i.e. broad integration), establishing a culture of collaboration (thus a culture of knowledge sharing and security for corporate memory), organisational knowledge assessments (knowledge audits) and knowledge capture (making knowledge explicit and contributing to corporate memory stability).

3.4.4 USA Military Knowledge Management Models

The USA Military KM model confirms the importance of KM processes, people, technology and culture to KM. The model represents people and culture (presumably this is organisational culture) as the foundation to KM, with technology in an enabling role to the KM principles. Based on the USA Army KM principles, Neilson compiled a presentation that contained a graphic model, depicted in Figure 3.8. These can be found as fundamentals in other KM models discussed in Chapter 2 of the dissertation. It confirms that these fundamentals have application and bearing on both private and public organisations – the military is a primary public organisation.

From the USA FM6-01.1. (2012: 3-5 and 1-9) another detail about the USA Army KM models is visible. The USA Army KM model, as per USA FM6-01.1., is a very simplistic graphic, packed with most of the KM elements discussed thus far in this dissertation – see Figure 3.9. The four organisational components of this model are also largely included in the model below (Figure 3.8). Of the four components illustrated, people are regarded as the most important – for obvious reasons already discussed up to now. What is also important is the fact that the components need an alignment, which implies integration and coherence.

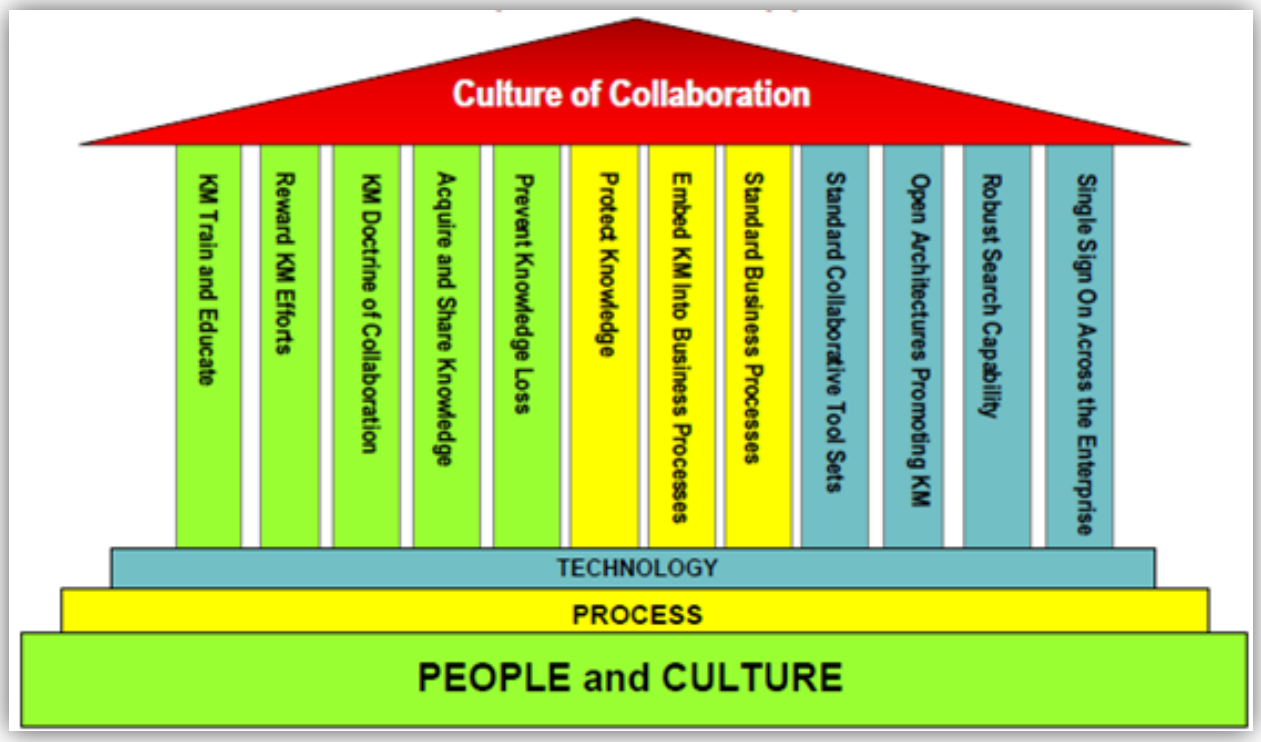
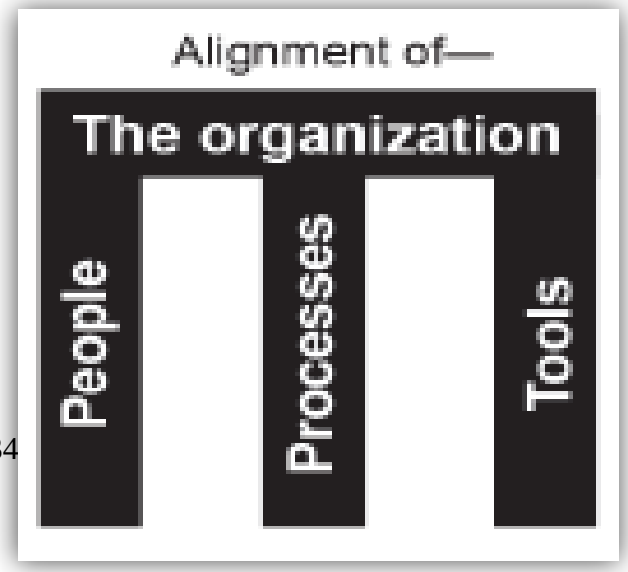


Figure 3.8: USA Army Knowledge Management – A Principles-Based Approach

Source: Neilson (unknown, slide 3).

The model is not prescriptive about the processes, however, description is provided in the narrative of USA FM6-01.1. (2012). Figure 3.10 elaborates on the detail missing in Figure 3.8 and 3.9. In the KM process model (Figure 3.10) primary KM processes are identified – i.e. assess, design, develop, pilot, and implement. The 2008 USAF ISR Strategy identified create, broker, bundle, export, import and use as KM processes. Again, like in the literature review, semantics are at play, but it also alludes to dissonance. The USA FM6-01.1. (2012) describes in detail the USA Army KM tasks and processes.

The KM tasks, distinctly categorised as content management activities, are knowledge creation, - organising, - applying, and – transfer. These are linked distinctly to improved shared understanding and decision-making. (USA FM6-01.1., 2012: 1.2 and Appendix A). The USA FM6-01.1. (2012: 1-3) summarises these tasks as follows – "… Knowledge creation is the process of developing new knowledge or combining, restructuring, or repurposing existing knowledge in response to identified knowledge gaps. … Organizing knowledge includes archiving, labeling [*sic*], and identifying. These are specific tasks of content managed under the implement step of the KM process. Organizing knowledge ensures that users can discover and retrieve knowledge that is relevant, and knowledge managers can track knowledge products throughout their life



cycle. … Applying knowledge refers to making knowledge accessible to those who need to use it. It seeks to create conditions so users can retrieve and apply the knowledge they need. This is the primary purpose of content management, and occurs during the implement step of the KM process. A key aspect is ensuring that multiple users can easily retrieve knowledge products, which enables collaboration in applying knowledge. … Knowledge transfer is the movement of knowledge — including knowledge based on expertise or skilled judgment — from one person to another. It describes how knowledge is passed between individuals and groups. It includes knowledge developed within the unit and received from other sources.

Figure 3.9: USA Army Knowledge Management Model

Source: USA FM6-01.1. (2012: 1-9).

Effective knowledge transfer allows all involved to build on each other's knowledge in ways that strengthen not only individual Soldiers but also the entire organization. It is more than simply moving or transferring files and data. Since knowledge transfer occurs between people, KM includes creating techniques and procedures to develop knowledge skills in leaders, build experience, and transfer expertise. … Knowledge transfer enables units and Soldiers to begin.".

Note that no mention is made of data or information. Supplementary to the KM tasks, the USA FM6-01.1. (2012) dedicates the entire Chapter 3 of the document to what is perceived as USA Army KM processes. Mortensen (2014: 13) states - "Understand that knowledge management is not a single cycle process, but an integrated series of cycles – some sequential, some in parallel". This is a good description of the dynamics involved. It clearly calls for integration.

The objective of the cyclical nature of the KM process model is to enhance continuous organisational performance, mission command and decisions. The process is cyclical with automatic backtrack options, thus allowing flexibility and adaptability in the application of the process. These processes are regarded as core KM processes, not ends in themselves, and supported by various sub-processes.

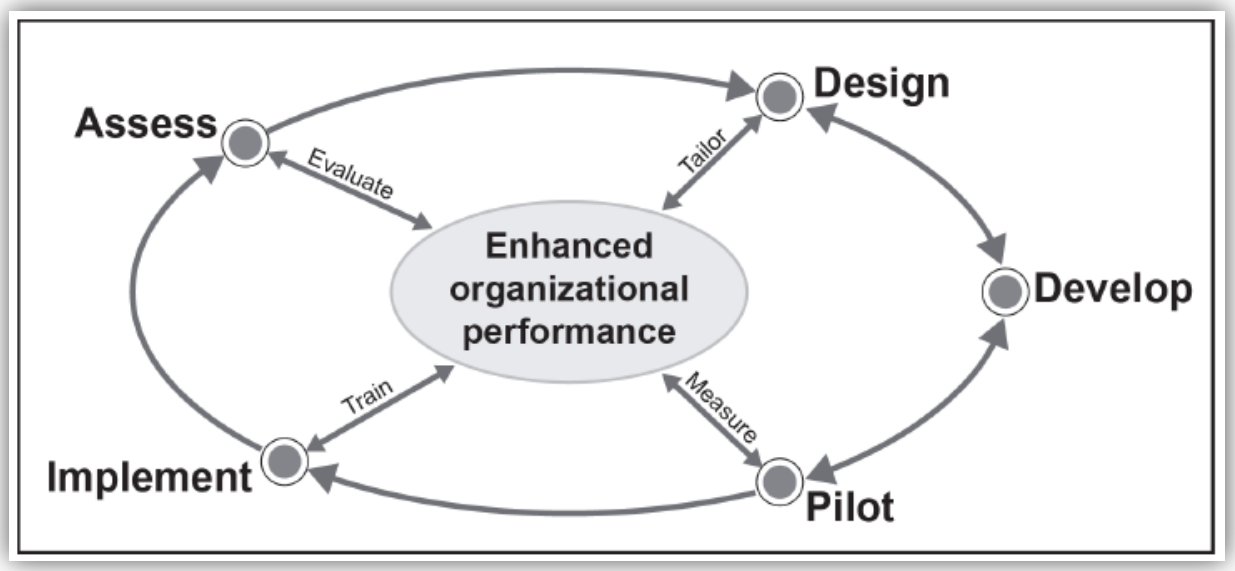


Figure 3.10: Knowledge Management Processes

Source: USA FM6-01.1. (2012: 3-1), also used in Weeks (2016: slide 13).

Assess provides the user with a process to monitor and evaluate the current situation and requirement for knowledge. "Assess information flow in the organization. Identify obstructions to the free flow of information (knowledge gaps), and identify the means of eliminating or minimizing those obstructions (knowledge solutions)." (Mortensen, 2014: 12). This corresponds to the OODA loop processes – observe and orientate. In short, the process determines what is required by leadership to make decisions and provides a gap analysis of what is known and what should be known in order to act and achieve the desired effects and, possibly, advantage. Design, as a process, aims at constructing knowledge artefacts (the researcher prefers the word 'artefact' instead of 'product' because of products commercial affiliation) and services that will enable enhanced decision-making, action, effects and advantage. Examples include new or updated doctrine and/or intelligence, new software, knowledge networks, access to experts in the field, access to retired expertise, etc. This step is dependent on the gap analysis that was completed during the assessment and is driven by the user requirements. The next step is to build the solution that will satisfy the requirements, after which it will be implemented for a pilot period to test and evaluate the output in terms of the requirement. Once the KM artefact or service has been validated it will be implemented and integrated into other KM artefacts and services that are already operational. This happens whilst the entire KM process runs concurrently, continuously assessing new situations to provide new solutions. (USA FM6-01.1., 2012 and Mortensen, 2016).

These process steps include a variety of subordinate processes and activities currently in use with the USA Army in support of achieving set objectives. A detailed discussion of each of these solutions is outside the scope of this dissertation but could be studied for applicability to the SA DOD in future research. However, to list them, would support the selection of KM processes for an SA DOD KMC.

The USA FM6-01.1. (2012) posits that not all KM tools are technology but anything that could facilitate the sharing of knowledge and information and the preservation thereof. This includes tools that use IT and software to make collaboration and communication possible in a structured way – e.g. communities of interest and/or –practice and/or purpose, professional forums, after action reviews, interviews, storytelling, etc.

Socialization	Externalization
1. Mentoring Program 2. Stakeholder interaction outside the organization 3. Conferences/Seminars 4. Opportunities to share Knowledge i.e., Lunch and Learn; Brown Bag Lunch; Guest Speakers, etc. 5. Communities of Interest 6. Encouraging/Rewarding Knowledge Sharing 7. "Off site" meetings 8. "Email Holiday"	1. IPTs/OPTs/Work Groups – the right people with the right knowledge and experience – Cross functional participation 2. Communities of Practice 3. After Action Reviews 4. Continuity Books - creating 5. Knowledge Capture - creating 6. Lessons Learned repository – creating 7. Military Decision Making Process (MDMP) 8. Tri-folds and "Marketing"
Personalization	**Combination**
1. On-the-job training 2. Individual learning, including e-learning 3. Knowledge Maps and Expertise Directories 4. Continuity Books - referencing 5. Knowledge Capture – referencing 6. Lessons Learned - referencing	1. Collaborative virtual environment – SharePoint; milSuite; All Partners Access Network (APAN); Defense Connect On-line 2. Telecommuting 3. VTCs 4. Instant Messaging

Figure 3.11: The SECI in Practice (USA Army)

Source: Weeks (2016: slide 15). Some of these tools are also addressed by Degen (2008: 106), Dalton (2010) and USA FM6-01.1. (2012).

The USA Army provides practical examples of KM tools that could be employed within each SECI component (discussed in Chapter 2 of the dissertation) that could be used individually by personnel or collectively by the organisation, as depicted in Figure 3.11. Some of the tools listed by USA FM6-01.1. (2012: 1-4, 1-5 and Chapter 3) are a wide variety of information systems, data analysis tools and search tools, an assortment of collaborative tools, expertise-location tools to find subject matter experts and expertise development tools in support of learning organisation objectives.

These tools or enablers are specific from organisation to organisation – depending on the level of sophistication and requirements. For militaries such as the USA military, these tools are extensive. The requirements for these systems for a developing nation such as South Africa will be very different in terms of scope and sophistication.

Noticeable, even for an organisation such as the USA military, is the absence of the criticality of knowledge security. It can only be assumed that it is somehow included in 'organisation' as part of Figure 3.7 and 3.9, as would aspects of leadership and culture be.

3.5 THE RELEVANCE AND ROLE OF A CHIEF KNOWLEDGE OFFICER IN THE MILITARY

Considering that leadership is identified by literature as probably the most important CSF to KM success, it thus seems pertinent to elaborate on a key leadership position in organisations from a KM perspective – i.e. the CKO. The USA military has recently separated the roles of the CKO

and the CIO. The CKO's roles and responsibilities are formalised by USA FM6-01.1. (2012) and the CIO's by USA AR25-1 (2013).

Neilson (2001), the CKO and professor at the Information Management College USA National Defence University, provides some interesting graphic illustrations on the roles of the CKO and why knowledge is important. He draws theory from seminal work by Earl and Scott (1999). Neilson concludes that the role of the CKO is fundamental to successful KM.

Militaries around the world are very familiar with the concept and requirements of IM, IT and all associated warfare disciplines (e.g. information warfare, electronic warfare, cryptography, cyber warfare, intelligence and counter-intelligence, etc.). Knowledge management, however, is a new concept to most militaries and would thus not have a CKO, but in most cases would have an organisational function that mirrors that of a function that would/could typically be headed by a CIO. The USA military has both acknowledged the importance of IM and KM as separate and distinct functional organisational requirements to ensure competitive advantage. The USA military elaborates extensively on the role of the CKO in KM doctrine as discussed above and in documents such as those by Mortensen (2014).

From a KM perspective and understanding from the literature review (dissertation Chapter 2) that IM and IT plays an enabling role to KM initiatives, it should thus be clear that the CIO function is a key supporting role to the availability of data and information. The output of the CIO function provides that product which when converted by any number or combination of conversion processes results in knowledge. That conversion processes are a key function of the CKO in support of enhanced decision-making, action, effects and advantage.

3.6 KNOWLEDGE SILO INTEGRATION

Knowledge silos are a distinct feature in most organisations. Manuri and Yaacob (2011: 74-75) state that although the Malaysian Air Force has various knowledge domains, resources and processes; these are present in silos and not managed in an integrated manner and hence not achieving the advantage it should.

Taken from the AKM (2008) and KM definition in Manuri and Yaacob (2011: 77) - "… a discipline that promotes an integrated approach to identifying, retrieving, evaluating, and sharing an enterprise's tacit and explicit knowledge assets to meet mission objectives" – identifies integration of various processes as fundamental to successful KM. Army Knowledge Online provides the USA Army with an integrated platform that provides access to the knowledge required for corporate and operational functions (Manuri & Yaacob (2011).

Integration was stated as an important consideration for successful KM in the USA military throughout Chapter 3 of the dissertation. Integration, as a fundamental requirement for military KM, is as important and very similar to the principle of 'jointness' in military operations. However, 'jointness' does not necessarily guarantee integration.

3.7 CONCLUSION

Very little academic material on military KM is available; let alone empirical studies. Due to the highly complex military operational and corporate environments, it would not have been unreasonable to expect much more academic exploration of the functionality that KM is providing to militaries. Yet, the academic space is sparsely populated with military KM research and publications.

The leader in military KM publications is the USA military, but mostly in military documents such as doctrine and lower level procedure. Because of the size and complexity of the USA military; USA military KM perspectives cannot just be exported and implemented in any other military organisation. Also, because knowledge and KM are highly contextual, countries should develop their own perspective on KM and how to implement it.

Military KM is important for several reasons; amongst others – survival, advantage and superiority; enhanced decision-making, flexibility and adaptiveness; actionable, decision-quality intelligence and knowledge; risk mitigation; enabling strategies and organisational effectiveness and efficiency.

A peculiarity of academic articles and organisational literature discussed thus far is the fact that virtually none discuss military intelligence distinctly as a primary function for KM and counter-intelligence as primary military KM security function. Very little is published on security as a requirement for KM. Knowledge security is mostly dealt with from an information security and counter-intelligence perspective. Most militaries will have policy and doctrine on information security – mostly found in intelligence and counter-intelligence policy, doctrine, tactics and techniques.

As discussed in the literature review (dissertation Chapter 2), knowledge is more than information and data. Thus, militaries should also be thinking about knowledge security, not just information security and related counter-intelligence policy and doctrine. Knowledge security and protection are addressed by the USA Army KM doctrine, thus confirming that it is a distinct requirement to be managed.

The largest and most complex military in the world has embraced KM as a military advantage enabler. The roles and functional separation between the CKO and CIO support academics views that knowledge and information are mutually re-enforcing and required to be competitive; with knowledge being the advantage driver. The USA military takes its mandate for KM from high-level doctrine, cascading KM down to the lowest levels of the organisation by means of leadership's initiatives, training and organisational policy, strategy, doctrine, tactics, procedures, processes and techniques.

The USA military defines KM as - "… the process of enabling knowledge flow to enhance shared understanding, learning and decisionmaking [sic]" (USA FM6-01.1. (2012: 1-1). However, this is not the only definition available for USA military KM – but probably the most authoritative. This is clearly a process-focused approach to KM; which is both pragmatic and practical but restrictive from a flexibility, adaptability and responsive perspective. Also, the definition does not

clearly link KM to action, effects and advantage but just understanding, learning and decision-making. If it is assumed that decisions will lead to action, effect and advantage then decisions is probably adequate. But such an assumption is risky.

The USA military identified capstone military knowledge as being policy, doctrine, intelligence, IP, tactics, techniques, procedures and processes. These are typical forms of structural capital from the perspective of IC. Thus, the document analysis (dissertation Chapters 5 and 6) focuses on the DR 2015, SA DOD Level 1 policy and doctrine as the highest form of strategic direction and guidance to organisational decision-making and action in order to make sense of the SA DOD's position on knowledge and KM. Within these documents, the researcher focussed on policy and doctrine expressions relating to policy, doctrine, intelligence and IP as forms of capstone military knowledge as these forms of structural capital will have a deciding influence on the future of the SA DOD. Tactics, techniques, procedures and processes will flow from these and could be the subject of further research and a future SA DOD knowledge audit.

The USA military identified key barriers to the successful implementation of KM, defined KM and crafted KM principles and processes from an organisational perspective. This is probably based on the fact that it is understood that KM is 'ba' specific and context driven and have to be tailored to suit the organisational requirements. Based on views from the literature review (dissertation Chapter 2), these are all components that are important for organisations that seek to implement KM initiatives and will thus be explored further in Chapters 5, 6 and 7 from an SA DOD perspective.

When considering the research problem and questions; there is a handful of studies addressing KM in the SA public sector – but there is no academic research on SA DOD or SA military KM. This could be reduced to a lack of interest in this particular type of management; it could be that the SA DOD is not aware of this type of management; and/or it could be that the security regime within the SA DOD hampers such endeavours and/or that the SA DOD does KM under the umbrella of knowledge domains such as intelligence and doctrine. The document analysis and subsequent questionnaires with key personnel within the SA DOD shed light on these and other questions regarding the perceived absence of KM within the SA DOD.

The discussions in the literature review (dissertation Chapter 2) and this chapter provide an overview of the diversity that exists amongst those that theorise and practice KM. Within the diversity, there are recurring themes and concepts and/or the diversity stems from semantics and practical applications. An important output of this research report is to construct a proposed definition for SA DOD knowledge and KM. Based on the discussion thus far, the researcher proposes the following working definition for SA DOD knowledge -

Knowledge is evolving meaning in the form of intellectual capital that capacitate understanding, decision-making, action, effect and advantage.

Figure 3.12: Proposed SA DOD Knowledge Definition

Source: Author's compilation of information and proposed for SA DOD KMC and KM.

This definition builds on the conceptions of Polanyi, Wittgenstein, Nonaka, Sveiby Spender and Marr and others that defines knowledge as the - "… capacity to act" and follows an interpretivist approach to understanding and knowledge – i.e. create meaning. The definition is aligned with the complexity and discontinuous change that characterise society, today and into the foreseeable future, in the sense that it conceptualise 'meaning' to constantly evolve into 'new/other meaning' due to that infinite amount of data, information and other knowledge available to the individual(s) trying to understand, make decisions, act survive or gain advantage.

Knowledge, defined thus, decouples it from individualised or organisational processes and prescriptiveness, setting it free to evolve with changing contexts and realities to remain relevant to the user when required. However, the definition also implicitly relies on processes to create meaning, take decisions and actions. These are critical for both survival and advantage. The implementation of the definition will rely on organisational policy to provide guidance to all KM initiatives within the SA DOD. All these issues highlight the requirement for KM. Based on the proposed working definition for SA DOD knowledge above, the following working definition for SA DOD KM is proposed by the researcher -

Knowledge Management is the integrated process transforming organisational intellectual capital into evolving meaning to capacitate understanding, decision-making, action, effect and advantage.

Figure 3.13: Proposed SA DOD Knowledge Management Definition

Source: Author's compilation of information and proposed for SA DOD KMC and KM.

This definition is closely aligned to the proposed definition of knowledge that was proposed above and could thus be associated with an interpretivist approach to knowledge and the management thereof, positioning the future management of SA DOD knowledge in third generation KM and aligned with the requirements of the knowledge era. The researcher chose not to make the proposed KM definition process-based and prescriptive because it limits the applicability of the definition within organisational components, functions and processes. The only prescript is the distinct requirement for integration. The proposed definition for SA DOD KM allows for flexibility and adaptation within complex, dynamic environments. The definition does not restrict military concepts of mission command and is closely aligned with the OODA loop and concepts of operation proposed by the Revolution in Military Affairs (RMA).

Figure 3.14 (below) proposes recognition of the internationally accepted knowledge hierarchy combined with other concepts relevant to the military environment. The graphic proposes that wisdom is composed of knowledge; knowledge of information and information of data – and that military effects should be the result of knowledge-based decisions and action (also wisdom if it is available), which should create and sustain military advantage. The hierarchy proposes (from literature) that there is a status difference in the value of the constructs. Based on discussions in the literature review (dissertation Chapter 2), the military KM (dissertation Chapter 3) the researcher proposes the following graphic to relate the various constructs to capstone military knowledge, the OODA loop, effects and advantage -

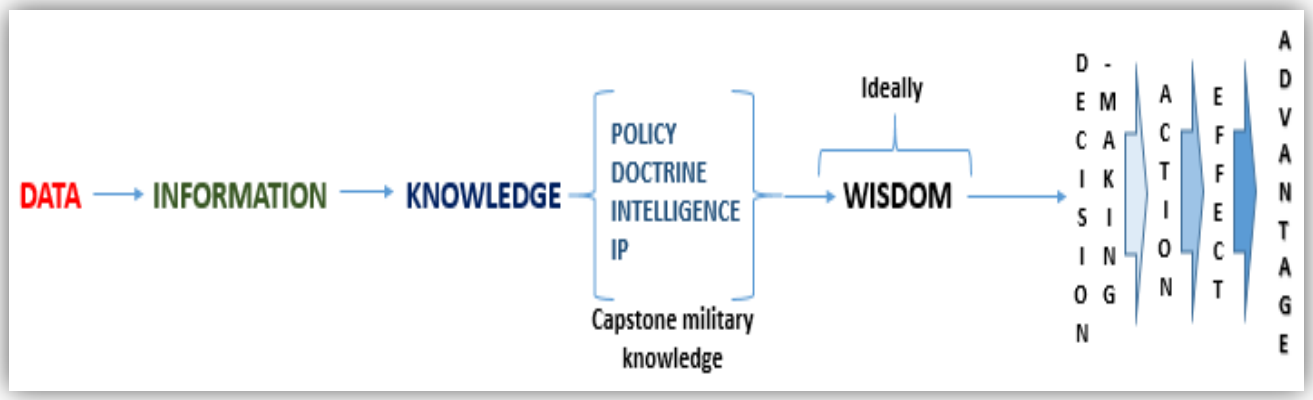


Figure 3.14: Proposed Knowledge Hierarchy

Source: Author's compilation of information.

The knowledge hierarchy can also be conceptualised as a knowledge continuum because of the difficulty to define the exact of separation between each construct. A knowledge continuum better represents the age-old conundrum of separation between the constructs. This suggestion is reflected in Figure 3.15 -

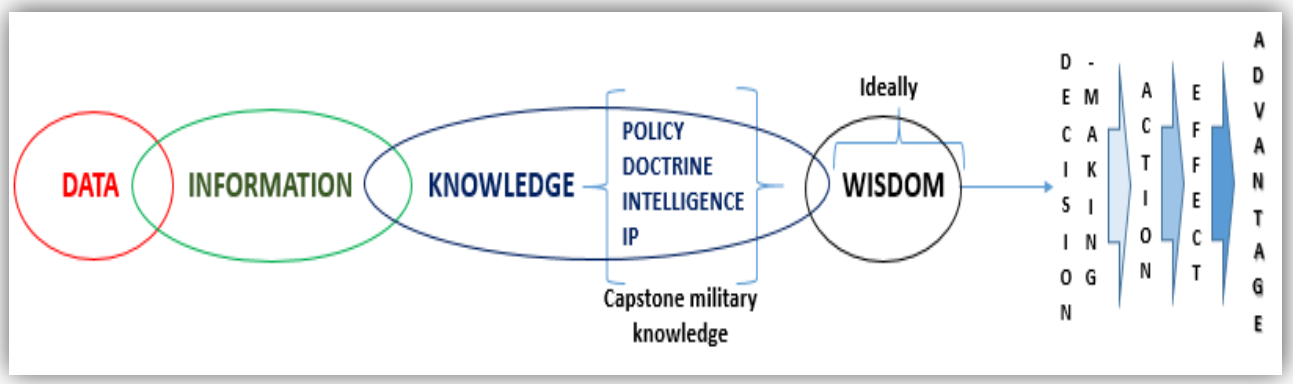


Figure 3.15: Proposed Knowledge Continuum

Source: Author's compilation of information.

Based on the literature review (dissertation Chapter 2) and military KM (dissertation Chapter 3) there should be KM coherence and integration within an organisation in order to enhance the quality of decisions, action and effect in order to unlock advantage. Coherent and integrated KM should at least reflect a common understanding of the knowledge continuum. The researcher is of the opinion that in order to be practical and have a more realistic chance of success, organisational knowledge should be understood as IC. It is thus not just a challenge of coherence and integration for the knowledge continuum but also coherence and integration of the components of the IC paradigm. Figure 3.16 represents this thinking -

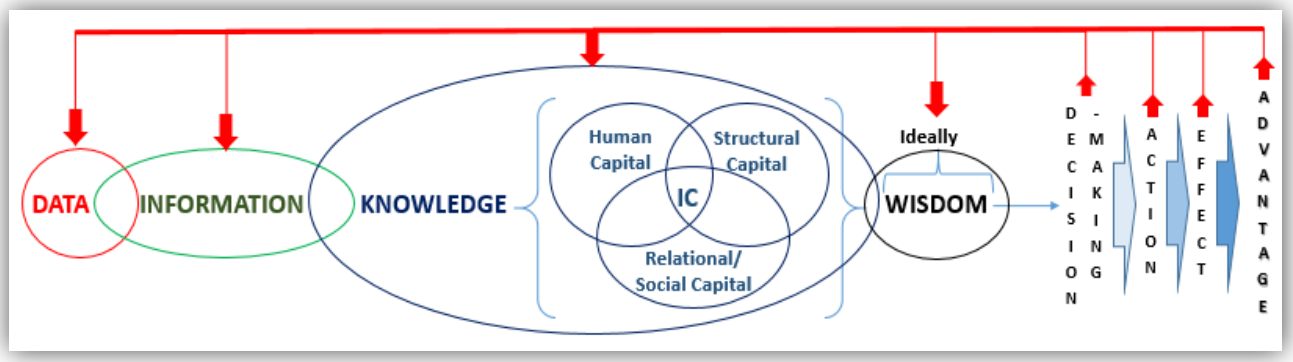


Figure 3.16: Proposed Knowledge Continuum (IC and Feedback Loops)

Source: Author's compilation of information and proposed for SA DOD KMC and KM.

Figure 3.16 also includes feedback loops indicating that it is not a unidirectional journey to advantage, but, based on the acceptance that knowledge is dynamic and evolves over time in order to keep pace with uncertainty, change, innovation and complexity - every decision, action, effect and element of advantage will create new data/information/knowledge/wisdom that will trigger more decisions, action, effect and hopefully elements of advantage – perpetually. In order to provide a focussed view of the proposed knowledge continuum (Figure 3.16) and the proposed KM definition (Figure 3.13), consider the following graphic:

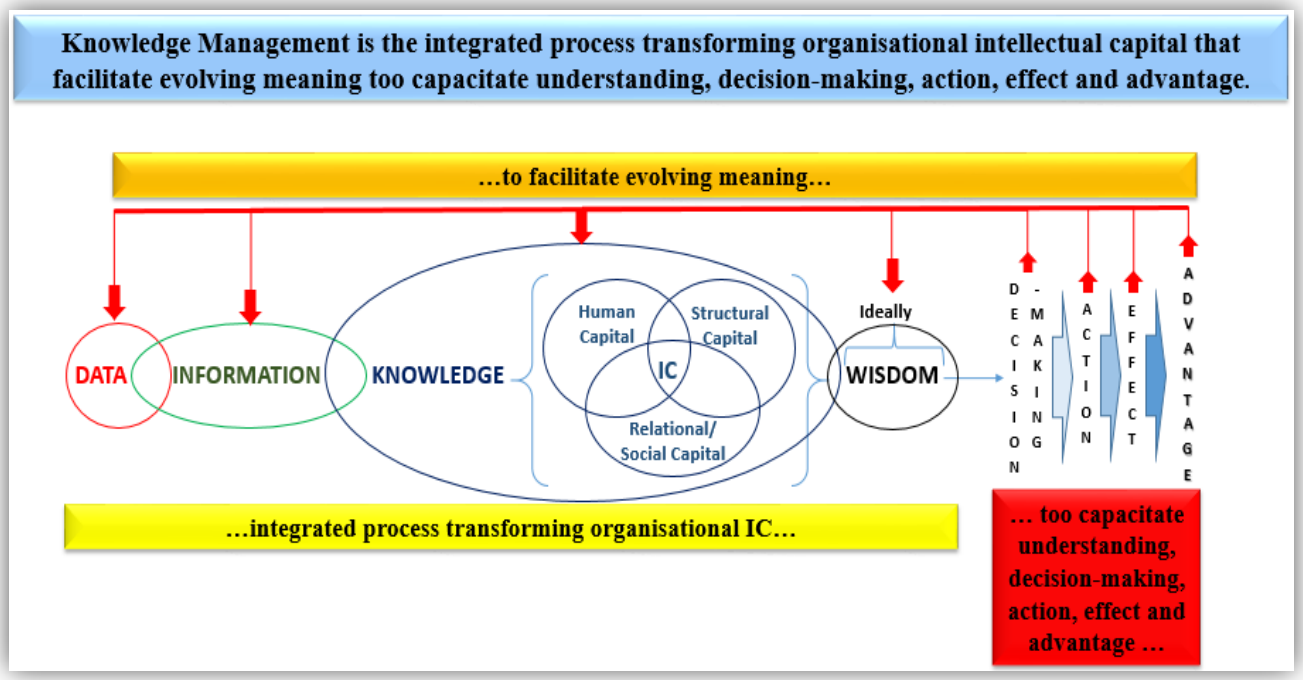


Figure 3.17: Proposed Knowledge Continuum (IC and Feedback Loops) with the Key Elements of the Proposed KM Definition

Source: Author's compilation of information and proposed for SA DOD KMC and KM.

Coherence and integration are the dark matter of this perpetual cycle. Without it the organisation will end up with several individual cycles that possibly focus on individual or lesser value combinations of knowledge continuum constructs that might affect decisions, action, effect and advantage sub-optimally. Currently, however, the SA DOD Level 1 policy and doctrine are

suffering from considerable construct dissonance with regard to knowledge continuum constructs. Based on the selected sample of SA DOD Level 1 policy and doctrine, Figure 3.18 depicts this dissonance -

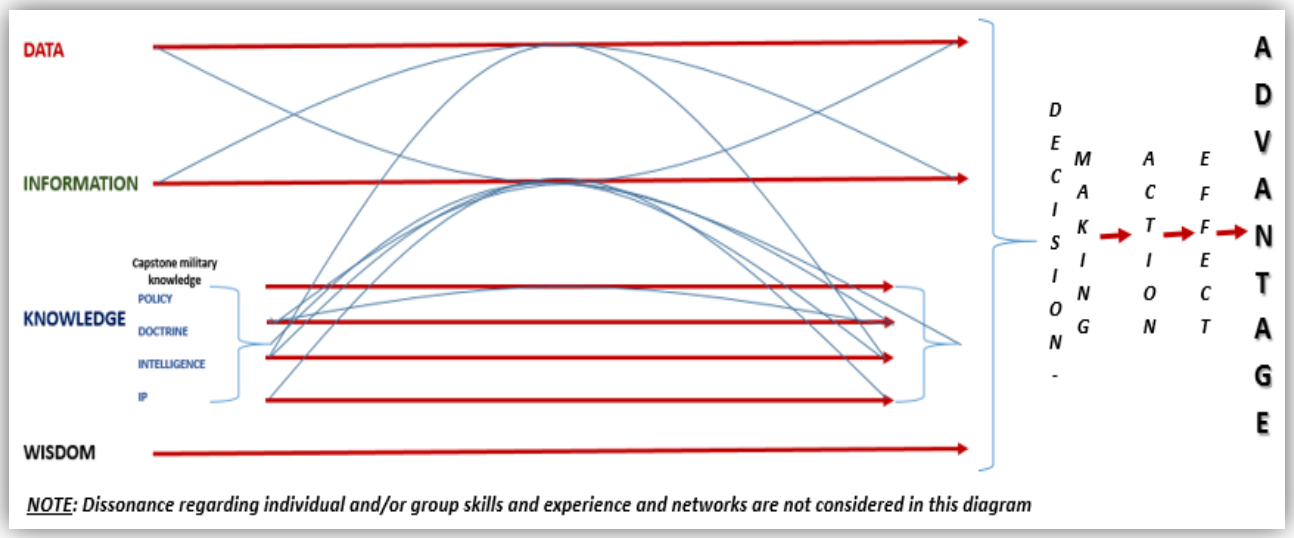


Figure 3.18: Reflection of the Current SA DOD Construct Dissonance

Source: Author's compilation of information. The red lines depict the distinct constructs and the blue lines depict the fact that constructs are used interchangeably and incoherently.

Combining the findings of the literature review (dissertation Chapter 2) and the military KM case study (dissertation Chapter 3), academic and organisational building blocks are provided for the final discussion on why the SA DOD should be interested in KM, what knowledge should be managed and how. These proposed definitions will inform the document analysis to follow. The next chapter of the dissertation discusses the research methodology followed during the research and the crafting of the dissertation.

CHAPTER 4 - RESEARCH DESIGN AND METHODOLOGY

4.1 INTRODUCTION

The purpose of Chapter 4 of the dissertation is to provide the reader with a detailed understanding of the methodology followed, why this methodology was selected, and how it was executed. The chapter introduce and discuss issues regarding the study area and units of analysis, research approach and methodology, the research process followed and aspects contributing to rigour and quality. A recognised research methodology was used to support systematic research.

4.1.1 Research Philosophy, Methodology, Design and Methods

Ngulube (2015) provides an excellent synopsis of the research philosophies, methodologies, design and methods used in KM research based on publications in the Journal of Knowledge Management (period 2009-2013). Ngulube (2015) provides a concise explanation of the interaction between these aspects of academic research. Another study that elaborates extensively on the relationships of these components was published by Na (2015). An outline of the research philosophy selected for this dissertation is discussed next.

Ontology and epistemology constitute the philosophical assumptions about the nature of knowledge (Ngulube, 2015). Na (2015: 58), drawing on the work of Easterby-Smith, *et al*. (2012) and Saunders, *et al*. (2009), states that – "… ontology is the philosophical assumptions about the nature of reality". This refers to the worldview of a researcher, and in particular whether such researcher has a predisposition towards being objective or subjective. (Saunders, *et al*., 2009) These worldviews divide social reality into at least the following ontological categories according to Easterby-Smith, *et al*. (2012) in Na (2015: 59) -

Ontology	Realism	Internal realism	Relativism	Nominalism
Truth	Single truth	Truth exists but is obscure	There are many 'truths'	There is no truth
Facts	Facts exist and can be revealed	Facts are concrete but cannot be accessed directly	Facts depend on viewpoint of observer	Facts are all human creations

Subjective (Sanders, *et al*., 2009)

Objective (Sanders, *et al*., 2009)

Figure 4.1: Ontological Research Assumptions

Source: Easterby-Smith, *et al*. (2012) in Na (2015: 29)

According to the categorisation in Figure 4.1 above, the researcher of this dissertation adopted a relativist worldview. There are many and varied points of view (contexts) about knowledge and the management thereof (discussed in Chapter 2 of the dissertation) and with varied applications

depending on the context and the worldviews of those that uses knowledge. Thus the difficulties to define these constructs. The second philosophical assumption to consider is about epistemology, i.e. – "…'what is knowledge and what are the sources and limits of knowledge (Eriksson and Kovalainen, 2008), and 'what constitutes acceptable knowledge in a field of study' (Saunders, *et al*., 2009)". (Na, 2015: 59) Definitions vary and are numerous, however, epistemological assumptions can be categorised into at least positivism and social constructivism according to Saunders, *et al*. (2009) and Easterby-Smith, *et al*. (2012) in Na (2015: 59). Na (2015: 60) provides the following comparison in Figure 4.2 below –

	Positivism	Social constructivism
The observer	Must be independent	Is part of what is being observed
Human interests	Should be irrelevant	Are the main drivers of science
Explanations	Must demonstrate causality	Aim to increase general understanding of the situation
Research progresses through	Hypotheses and deductions	Gathering rich data from which ideas are included
Concepts	Need to be defined so that simplest terms	May include the complexity of 'whole' situations
Generalization through	Statistical probability	Theoretical abstraction
Sampling requires	Large numbers selected randomly	Small numbers of cases chosen for specific reasons

Figure 4.2: Epistemological Research Assumptions

Source: Easterby-Smith, *et al*. (2012) in Na (2015: 29)

The researcher of this dissertation calibrate his relativist worldview with social constructivism. The researcher is part of the research area and the research are in the interest of the individuals and the organisation constituting the study area. The researcher also construct rich description of the phenomenon and make theoretical abstractions. The selected case study is based on one organisation (the SA DOD) with a secondary case study being part of the literature review (also one organisation – the US military). The constructivist seeks to construct reality from the perspective of the individual and is thus associated with subjectivism, following more than often a qualitative research methodology. Thus, the researcher follows a 'there is more than one truth'

approach as described in Figure 4.1. Positivism is associated with the objective realities typically found within the natural sciences. It is organically, facts-based and objectivist - following more than often a quantitative research methodology. Ngulube (2015: 29) provided a graphical representation of the relative position of these components to assist with conceptual understanding in Figure 4.3 below –

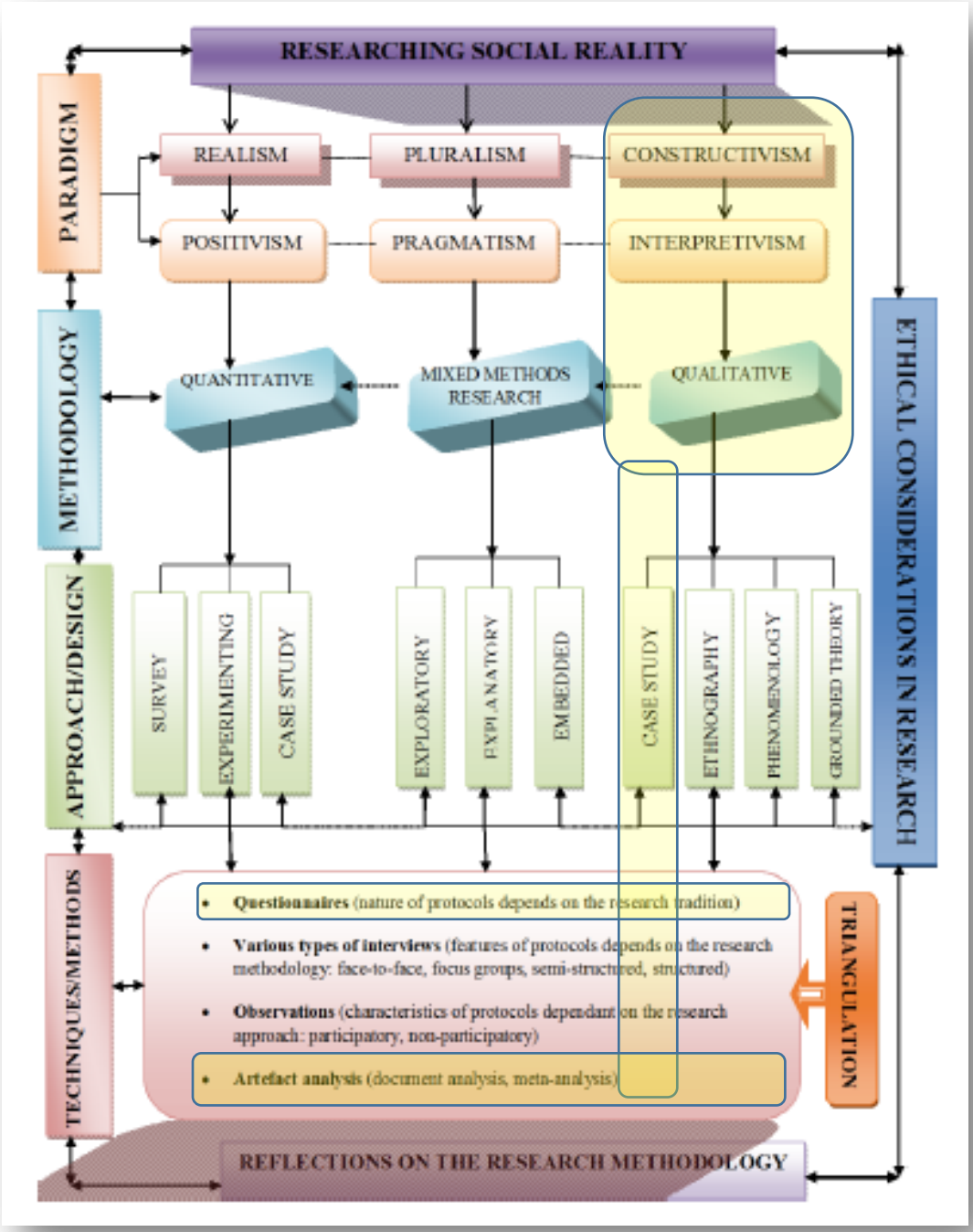


Figure 4.3: Research Paradigms, Methodologies, Designs and Methods followed by this Dissertation

Source: Ngulube (2015: 129)

To summarise, the researcher has a relativist worldview (ontological assumption), calibrated with a social constructivist paradigm (epistemological assumption), favouring a qualitative research methodology

and case study research approach/design that will render the rich description of the phenomenon using techniques such as document analysis and questionnaires.

4.1.2 The Research Area and Unit of Analysis

The research area for this dissertation is the SA DOD. There are at least three distinct sources of knowledge (or IC) within this research are - SA DOD employees (human- and relational capital), organisational documents and SA DOD related legislation (structural capital). These sources form the units of analysis for the dissertation. This makes document analysis and questionnaires attractive options as research techniques. Consistent with the theory that people create, store and use knowledge (Levit & March, 1988 as well as Grant, 1996a & b); a selected sample of SA DOD Senior Management was identified to voluntarily complete a questionnaire consisting of a compendium of open-ended questions. The research area and unit of analysis is graphically represented in Figure 4.4.

Figure 4.4: Research Area and Units of Analysis

Source: Author's compilation of information.

The selected sample of SA DOD personnel represents the leadership strata of the SA DOD. This leadership is divided into at least two components – the Secretariat of Defence senior management and the command cadre within the SANDF (reflected in Sections 199(1) and 204 of the Constitution). This strata of leadership must execute KM or at least have an interest in KM for knowledge to be managed in the SA DOD. The sample selection criteria for possible participants are discussed later in this chapter. The Depatment of Military Veterans and its members were not included as units of analysis because of the limited access the researcher had to the structures, members as well as the relative newness of the organisation. Future studies may explore the integration of the Military Veterans KM with that of the SA DOD.

4.1.3 Qualitative Research Methodology

The researcher recognises the fact that there is an ongoing (albeit mature) debate on the primacy of qualitative vs. quantitative research methodology. In agreement with the arguments of Collins (1984), Eisenhardt (1989), Flyvbjerg, (2006) and Neuman (2011), and various other authors, a qualitative approach to data collection, management and analysis was employed. Collins (1984) states that -

> "Words are not only more fundamental intellectually; one may also say that they are necessarily superior to mathematics in the social structure of the discipline. For words are a mode of expression with greater open-endedness, more capacity for connecting various realms of argument and experience, and more capacity for reaching intellectual audiences" (Collins, 1984 in Neuman, 2011: 509).

The appropriateness of qualitative research typically applies when the researchers aim at revealing the nature of certain situations, processes, relationships and systems. "Instead of variables [closely associated with quantitative research], we examine motifs, themes, distinctions, and perspectives" (Neuman, 2011: 175). Eisenhardt (1989) aptly describes this as the answers to the question 'why?'

Understanding of a particular phenomenon is enhanced by the qualitative researcher's interpretative ability (Leedy & Ormrod, 2005: 134-135). Qualitative research also allows the researcher to gain insight into the specific phenomenon and develop new concepts or theoretical approaches to the phenomenon. Numerous scholars (Eisenhardt, 1989; Leedy & Ormrod, 2005; Badenhorst, 2007; Flyvbjerg, 2006; Baxter & Jack, 2008; and Neuman, 2011), amongst others, agree on the fact that qualitative methodologies lend itself to extract and create a deeper understanding of a particular phenomenon and describing it layer-for-layer – or thick description according to Badenhorst (2007). This 'deeper understanding' is important for this research, specifically to understand why the SA DOD seems to be disinterested in KM and why the SA DOD should be interested in KM.

Lee (1999: 6) describes some of the quantitative research limitations as being limited in respect of allowing the researcher to explore multiple realities (from an ontological assumption perspective); to interact with the phenomenon being studied (from an epistemological assumption perspective); to take cognisance of biases and values that affect the phenomenon (from an axiological assumption perspective); to use context to transform the language used in the description (from a rhetorical assumption perspective); and to use - "… induction, multivariate, and multiprocess [*sic*] interactions, and context-specific methods". Lee (1999) and others (Eisenhardt, 1989; Flyvbjerg, 2006; Neuman, 2011) are of the opinion that qualitative research methodologies do not limit these. Neuman (2011: 214) writes -

> "Many qualitative researchers question the quantitative researcher's quest for standard, fixed measures and fear that such measures ignore the benefits of having a variety of researchers with many approaches and may neglect key aspects of diversity that exist in the social world".

Quantitative research is very useful for the identification of relationships (correlation) between and significance of variables; but it is qualitative research that provides the utility to understand the reasons for such relationships or correlation (Eisenhardt, 1989). It is this understanding that is important for organisational development, policy and strategy formulation and resource management. It allows for open-ended thinking. Na (2015: 70) states – "Overall characteristics of qualitative research methods can be concluded to be subjective and deductive approaches… [and are] useful methods for performing exploratory [research].".

Quantitative research could test certain variables for significance, but would then ultimately discriminate against other variables that were not considered. Thick description, as conceptualised

by the academic community should, therefore, provide a more accurate, nuanced and relevant understanding that could be subjected to quantitative methods in follow-on studies to determine specific significance. The researcher agrees with the conception of Flyvbjerg (2004: 432 and 2006: 242) that - "Good social science is problem-driven and not methodology-driven in the sense that it employs those methods that for a given problematic, best answer the research questions at hand.". Na (2015: 74) provide a schematic that summarises the main differences between quantitative and qualitative approaches in Figure 4.5 blow -

	Qualitative	Quantitative	Authors
Purpose of researches	• Understand phenomena	• Explain causes	Firestone (1987)
	• Contextualisation • Participants' meanings	• Generalisation • Absolute and objective truth	Creswell (2009)
	• Validity	• Reliability	Duffy (1987)
Approaches	• Deductive	• Inductive	Saunders et al. (2009)
	• Cross-case comparisons	• Predictable	Johnson and Onwuegbuzie (2004)
	• Case-by-case / specific to each case	• Replicable	Johnson and Onwuegbuzie (2004)
Position of researchers	• Insiders' perspective	• Outsiders' perspective	Duffy (1987)
	• Participants' point of views	• Researchers' point of views	Creswell (2009)
Condition of data	• Specific variables	• Holistic and wide rage of data	Duffy (1987)
	• Theoretical data	• Statistical data	Creswell (2009)

Figure 4.5: Comparison between Qualitative and Quantitative Approaches

Sources: Creswell (2009); Bryman (2012) and Saunders, Lewis & Thornhill (2009) in Na (2015: 74).

Therefore, to extract a rich understanding of the prevailing motifs, themes and perspectives interacting within a social space and associated peculiarities, the researcher must interact with the unit of analysis of the area of study.

Quantitative methods could be used subsequently to determine the significance of the qualitative findings, but without the initial understanding of the dynamics of the area of study and

the unit of analysis there would be nothing to test quantitatively. In essence, qualitative approaches allow research results that could not necessarily be accomplished through quantitative research approaches (Corbin & Strauss, 2008). Thus, a qualitative research methodology was used for this dissertation.

4.1.4 Research Design: Single Case Study

In studying the KM body of knowledge there are both positivist approaches (typically suited for empirical studies, e.g. Kruger & Johnson, 2009; Girard & McIntyre, 2010; Manuri & Yaacob, 2011, Musimwa-Makani, 2012) but mostly interpretative and critical approaches (typically suited for single case- and multiple case studies – e.g. Bartczak, Boulton, Rainer, Oswald & O'Malley, 2010).

The case study research design dates to the 1920s with its origins in sociological studies. Currently, most case studies use qualitative research approaches (Badenhorst, 2007, Neuman, 2006 and 2011). "Qualitative case studies afford researchers opportunities to explore or describe a phenomenon in context using a variety of data sources" (Baxter & Jack, 2008: 544). Case study research designs are typically appropriate when - "(a) the focus of the dissertation is to answer 'how' and 'why' questions [description and exploration]; (b) you cannot manipulate the behaviour of those involved in the study; (c) you want to cover contextual conditions because you believe they are relevant to the phenomenon under study; or (d) the boundaries are not clear between the phenomenon and context" (Yin, 2003 in Baxter & Jack, 2008: 545). The goal of this research is to establish 'why' there is a perceived disinterest in KM in the SA DOD; 'why' KM is important to organisations such as the SA DOD and 'how' this could be achieved. A single case study design with embedded units was used to analyse the SA DOD through document analysis and supported by questionnaire data. Case studies are also considered appropriate where few studies have been conducted (Benbasat, Goldstein, & Mead, 1987; Eisenhardt, 1989 and Guy, 1994)

Yin (1994: 13), assuming a constructivist[65] posture, states that - "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident". This view is supported by Baxter and Jack (2008). At the heart of qualitative case study research is expert, context-specific and dependent knowledge according to Flyvbjerg (2006). Case study research is thus well suited to construct new meaning on SA DOD KM due to its focus on contextual expertise as well as contextual issues surrounding the research questions. Reality is the focus and not some form of artificial laboratory experiment or environment.

Neuman (2006: 40), Leedy and Ormrod (2005: 135) Badenhorst (2007) state that case study research involves the examination of - "… individuals, groups, organisations, movements, events, or geographic units" and/or components of these and how they relate to each other over a specific period of time and in specific contexts. The SA DOD exhibits all these components and most of them use and creates knowledge. They are contextually bound by various factors at specific times or over specific periods within specific spaces.

[65] Constructivist's paradigm "recognizes the importance of the subjective human creation of meaning, but doesn't reject outright some notion of objectivity." (Miller & Crabtree, 1999 in Baxter & Jack, 2008: 545)

When building theory or models from case studies there is a habitual overlap of data collection and analysis (Eisenhardt, 1989). In fact, Glaser and Strauss (1967) in Eisenhardt (1989: 538) argue for the - "… joint collection, coding, and analysis of data" to accomplish the outcome. A joint approach enables the researcher to conduct early analysis and also to introduce flexibility to the process in order to make changes to the data collection process to unearth emergent themes that were not evident earlier in the process (Eisenhardt, 1989). Once possible contributions emerged the data collection methods can be adapted (Gersick, 1988; Harris & Sutton, 1986; Sutton & Callahan, 1987; and Barton, 1988 in Eisenhardt, 1989). However, it must be reiterated that the flexibility allowed within qualitative case study designs is not consented to be unsystematic in execution (Eisenhardt, 1989), which might result in drifting away from the purpose of the dissertation.

The researcher could not find any research on SA DOD KM. The closest to this was to analyse the published academic and other material addressing KM theory and application in the wider business and public service environment. The definitions of knowledge and KM for the purpose of this research have been deductively derived from literature (Chapters 2 and 3 of the dissertations). The USA case study (Chapter 3 of the dissertations) was a desktop study of published literature on the topic. It did not include implementation tactics, practices and procedures. Deductively-determined origins of SA DOD knowledge and KM will follow in Chapters 5 and 6 as part of the SA DOD case study.

This dissertation focus on document analysis in the literature review (Chapters 2 and 3 of the dissertations) and in particular on relevant national legislation, the DR 2015 and a selected sample of SA DOD Level 1 policy and doctrine. All the documents represent a snapshot of the prevailing thinking and understanding of a particular phenomenon at that time within national and organisational space. The researcher first completed the literature reviews of Chapters 2 and 3 before commencing with the SA DOD case study. This provided a broad scope of perspectives regarding KM. The risk of doing the literature reviews and SA DOD case study concurrently is that the findings and insight provided would have augmented the researcher's perception of KM and thus caused the literature reviews to become narrowly focused and directed, rather than 'open-ended and exploratory'. Supporting the document analysis, questionnaires were issued first to a selected group of SA DOD Senior Managers (16) and in later rounds to the entire strata of SA DOD Senior Managers (275) that is accountable for SA DOD knowledge and the management thereof.

Because the unit of analysis consists of the IC inherent in two primary organisational components with two distinct functions – i.e. the Sec Def and the SANDF – a single case study with embedded units design was used. This enabled the researcher to explore the unit of analysis while considering the interaction and management complexities between the two embedded units where evident. Yin (2003) writes -

> "The ability to look at sub-units that are situated within a larger case is powerful when you consider that data can be analyzed *within* the subunits [*sic*] separately (within case analysis), *between* the different subunits [*sic*] (between case analysis), or *across* all of the subunits [*sic*] (cross-case analysis). The ability to engage in such rich analysis only serves to better illuminate the case." (Yin, 2003 in Baxter & Jack, 2008: 550).

Thus, the researcher used a single case study design for the area of study with embedded units and a qualitative data collection, management and analysis approach. The approach will allow

'why' and 'how' questions to be answered about SA DOD KM due to the fact that very little is known about SA DOD KM and both KM and the SA DOD are complex and extremely contextual. The design assisted the researcher to respond to the assumption that the SA DOD is not interested in KM; why the SA DOD should be interested; and which type of knowledge should be managed and other KM fundamentals required for a coherent and integrated KMC.

4.2 THE PROCESS

Published literature was used to gain an understanding of the KM body of knowledge; its history, epistemology, ontology and how it manifests itself in private and public organisations. This is accomplished with a documentary assessment of the general KM theory and practice in the literature review (dissertation Chapter 2) and review of literature of military KM (dissertation Chapter 3); sequentially completed before the document analysis of SA DOD related legislation and documentation commenced (dissertation Chapters 5 and 6) in order to mitigate bias towards the findings in the relevant SA DOD documents. This formed the basis for the proposed knowledge and KM definitions. It also assisted with the identification of fundamental KM issues to be considered for the construction of a future SA DOD KMC. These proposed definitions calibrated the rest of the research because of the focus it provided within the KM body of knowledge.

Document analysis of published literature was used to establish the importance of knowledge and KM to organisations. This is in support of the research question about why the SA DOD should be interested in the KM (SRQ 2). Combined with research to identify the principles, activities, KM models, CSF and best practices that inform KM initiatives were identified. This was completed for both business and militaries due to the raison d'être[66] differences between private and public service organisations. Deduced from this analysis was fundamental issues to be considered for SA DOD KM initiatives and KMC.

Document analysis of relevant and a selected sample of SA DOD documents (dissertation Chapters 5 and 6) followed the completed literature reviews in Chapters 2 and 3. The research focused on the perception of a disinterest in KM by the SA DOD (SRQ 1) but also to what extent the KM is important to the SA DOD and how does the SA DOD busy itself with KM (knowingly or unknowingly). The document analysis is also important to identify and understand what knowledge the SA DOD has and should be managing (SRQ 3). Answers to SRQ 1-3 placed the researcher in an ideal position to construct a conceptual SA DOD KM model as part of the fundamentals for SA DOD KM (SRQ 4).

The insight gained from the literature reviews and SA DOD case study analysis assisted the researcher to construct a questionnaire with open-ended questions to be completed voluntarily by SA DOD Senior Management respondents. The purpose of the questionnaires was to gather knowledge on issues relating to SRQs 1-4. Responses aim at providing useful insight and confirmation of interest in SA DOD KM. The number of no responses were indicative of the level of interest in SA DOD KM. The entire process placed the researcher in a better position to assess the impact of the research on both theory and practice and also to suggest future research areas.

[66] "The most important reason or purpose for someone or something's existence" (Oxford Dictionaries. Online. https://en.oxforddictionaries.com/definition/raison_d'etre)

4.2.1 Methods: Document Analysis and Questionnaires

The research commenced with literature reviews on KM-related theory and practice (dissertation chapter 2) and military KM (dissertation Chapter 3) to establish the conceptual framework for the research. The primary data/information/knowledge collected focused closely on the research questions. The collection process did not aim at total saturation of the subject field; also to limit drifting away from the purpose of the dissertation – but wide enough in scope to facilitate deductive reasoning.

Initially, the researcher used the work of Ma and Yu (2010) to identify pioneers in the field of KM. Ma and Yu's research span the period 1998-2007, covering an important cross-section of the KM hype cycle described by Riempp & Smolnik (2007: 3). This provided theoretical and empirical direction as to important authors, subject fields, academic and operational themes, concepts, etc. that influenced KM.

Primary data/information/knowledge (literature) was collected from several so-called databases (e.g. Google Scholar, Emerald, EBSCO and Proquest, etc). Search keywords were restricted to knowledge, knowledge management, knowledge management factors, knowledge management strategy, knowledge management failures, knowledge management barriers, knowledge management successes, knowledge management critical success factors, knowledge management models, defence knowledge management, military knowledge management, and/or combinations of these.

Published literature and other material published online (typical organisational policy, strategy, doctrine, field manuals, etc.) detailing military KM initiatives (specifically the USA military as a small case study) were used in the chapter on military KM (dissertation Chapter 3). The USA, a premier military superpower, initiated KM more than a decade ago and has published extensively (typically USA military documents) on progress made. No bias was intended. Thus, a small case study was done on the USA KM initiatives (in the form of a literature review and document analysis) to find answers to SRQ 2-4. The research did not attempt to analyse all the available USA military policy and doctrine on KM but focused the analysis and discussion on answering the research questions. The focus of the analysis hovered at the strategic level rather than drilling down into tactical solutions, which could be highly contextual. This was supplemented with literature and official documents available in the public domain about other international militaries' KM initiatives, found to be very limited. Chapter 3 thus constitutes a literature review on military KM - excluding the SA DOD which forms the area of study and unit of analysis in Chapter 5-7.

The deductive output of the literature reviews (Chapters 2 and 3 of the dissertation) facilitated a broad understanding of knowledge and KM as two distinct constructs; theoretically and as applied by businesses and militaries. These two chapters provided relevant insight into the body of knowledge to support the formulation of open-ended questions for the questionnaire (dissertation Chapter 7). Once a wide swathe and deliberate understanding of the field of study was established the researcher shifted focus to document analysis relevant to the unit of analysis. This sequencing was followed based on the researcher's initial lack of knowledge about KM.

The second part of the dissertation focussed on document analysis consisting of analysis and discussion of the relevant RSA legislative framework and SA DOD DR 2015 (dissertation Chapters 5). This was enriched with deeper-level understanding of the SA DOD, gained with an analysis of a selected sample of SA DOD Level 1 policy and doctrine (dissertation Chapters 6).

The selected search keywords in the above-mentioned documents were knowledge, knowledge management, intelligence, doctrine, Intellectual Property (IP), Chief Knowledge Officer (CKO), information, information management, data, Chief Information Officer (CIO). These keywords were selected based on the understanding gained from Chapters 2 and 3 of the dissertation. The selection criteria for the selected sample of SA DOD Level 1 policy and doctrine were as follows:

- The policy and doctrine must be available on the SA DOD policy database. As such a snapshot of the policy database was obtained as a searchable database folder called *pp_static_20160617*. This folder is also time stamped (20160617). This provided stability to the analysis in terms of the available documents for analysis, contributing to research rigour in terms of the repeatability of the research. This folder is available on request with due regard to SA DOD security requirements. The second part of the Reference List provides a coded list of the selected sample used for analysis in Chapter 6 of the dissertation.
- The policy and doctrine must be promulgated and current. Policy and doctrine that were archived or superseded were thus excluded from the selected sample.
- Only SA DOD Level 1 policy and doctrine promulgated during or after 2005 were considered. Promulgation is defined as ratification by the Sec Def or CSANDF or both. This time parameter (2005) was selected based on the Riempp and Smolnik (2007: 3) KM hype-cycle. It could be reasonably expected that the SA DOD would have been sensitised and interested in KM as a management phenomenon, even initiated KM initiatives, based on the hype-cycle. Based on the DR 2015 acknowledgement of the SA DOD still being in the information era, the parameter (2005) could easily have been shifted towards 2015. However, the researcher chose to be pragmatic and considered SA DOD Level 1 policy and doctrine from 2005 onwards in order to gain a deeper understanding of the possible issues prevailing. This approach rendered a substantial amount of documents for analysis.
- Only SA DOD policy and doctrine with a security classification of ‘restricted’ or ‘confidential’ were considered for analysis. SA DOD KM is a general business process and management concern and would in the opinion and experience of the researcher not be classified secret or top secret.

Importantly, Chapter 6 of the dissertation (SA DOD Level 1 policy and doctrine) makes extensive use of quotations for the simple reason that these documents (SA DOD Level 1 policy and doctrine) are not in the public domain. The reader is thus privy to the actual text of classified documents. The output of Chapters 5 and 6 of the dissertation enabled a comprehensive understanding of the SA DOD Level 1 policy and doctrine regarding knowledge and KM.

The third part of the the dissertation is the gathering of data/information/knowledge with a questionnaire. The findings of the dissertation thus far (dissertation Chapters 2, 3, 5 and 6) assisted the researcher with open-ended questions formulation. These chapters clarify why there is a perception that the SA DOD does not engage in coherent and integrated KM and why possibly the

SA DOD should. Once these chapters were largely completed in draft, a questionnaire was compiled and issued to potential SA DOD Senior Management level respondents.

The questionnaire constitutes open-ended questions. The researcher used a questionnaire, completed voluntarily by a purposeful sample of SA DOD Senior Managers (which was subsequently broadend to include all SA DOD Senior Managers) to extract qualitative data/information/knowledge as input to all four research questions. Once the questionnaire was distributed no further liaison with the respondents ensued that would possibly augment perceptions of interest/disinterest in SA DOD KM. The questionnaire is attached as Appendix B of the dissertation.

The researcher administered the first round of questionnaires to 16 SA DOD SMS members based on the sample criteria discussed below. This, however, rendered very poor response, which hampered the research and drawing robust conclusions in support of answering 2-4. Based on expert advice the second round of questionnaires was administered to all SA DOD SMS members (275 potential respondents), following the command line for requests and instructions. The results of this process are discussed in Chapter 7 of the dissertation. Questions raised by respondents were answered telephonically or face-to-face as objectively as possible. There were extremely few enquiries.

Open-ended questions were the preferred type of question to allow for exploration. A questionnaire with open-ended questions was preferred in lieu semi-structured interviews because of several reasons:

- SA DOD SMS members have very congested work schedules that allow very little time for this type of research.
- Questionnaires with the same questions that would have been asked in interviews were used to allow respondents time to reflect and answer without being placed on the 'proverbial spot' - which would have been the case in an interview. The approach allowed the respondents to think carefully about their answer because some of the questions required some memory search to recall possible events or occurrences. It also affords the respondents (based on the public profile and position of responsibility) to carefully formulate positions. The aim was thus to extract considered responses not just responses. It also allowed the respondents latitude to complete answers when they had a break in there work schedules.
- A written/typed response eliminates the requirement for member checking. Member checking, as used in the interview process to ensure accuracy, would place a further burden on the respondent's already oversubscribed schedule.
- The text provided by the respondents can be processed similarly to interview transcripts.
- Filling out questionnaires does, however, exclude the researcher from personal interaction with the respondent, thus precluding the observation of body language and other environmental data. This does not affect the respondent's written/typed opinions, considered primary data/information/knowledge that can be subjected to re-analysis as part of qualitative rigour.
- Interviews provide the guarantee that the respondents' opinions are collected while questionnaires leave the 'back door open'; tasking staff to respond to the questionnaires. Thus, the assumption was made that the formulated answers were at least checked by the respondent.

Where the respondent signed, the questionnaire the responses can be construed as being that of the respondent.

- Semi-structured interviews with open-ended questions are important to allow latitude for expression. This same latitude can be achieved using the same questions and allowing the respondent to answer in their own time in questionnaire format.
- Questionnaires minimise distractions associated with open-ended conversations, i.e. drifting away from the research problem and questions for various reasons.
- The approach is especially useful if the researcher is not an experienced interviewer; and even more so when the interviewer is a colleague and in some cases a subordinate of the interviewee.
- Some rich description might be lost due to this approach but will be balanced with the fact that the researcher will remain in control of the process and no time will be lost due to unrelated conversations. This may result in less, but more relevant, data/information/knowledge collected.

The purpose of the questionnaire is linked to the concept of 'rich description' and 'deeper understanding' propagated by various qualitative researchers. Conceptually, the rich description can be extracted from - "Both long-term involvement and intensive interviews" to reveal reality (Becker's, 1970, 51ff in Maxwell, 2009: 244). In order to achieve this Maxwell (2009) states that when interviews are used as a method of data collection, these should then be transcribed verbatim to ensure all the nuances is captured for processing and triangulation. Questionnaires with the same open-ended questions that would have been used in interviews achieved the same results. The questionnaire data/information/knowledge collected could be used for coding and aggregation.

The researcher did not use web-based survey tools such as, for example, SurveyMonkey[67] because of security concerns regarding the disclosed information. Also, the approvals obtained from the SA DOD to conduct the research on SA DOD KM did not include permission to use such cyber tools.

The research was exploratory in nature at first (asking 'why' questions to provide clarity for SRQs 1 and 2) to extract maximum context and understanding in support of subsequent research and discussion. The questionnaire was supplemented with consent forms, scanned and stored on hard disk. No member checking was required as discussed above. The only member checking that was required was in the case of writing legibility, unfinished sentences and to verify if the question was understandable when it was not answered. No such case was recorded. In fact, only two questionnaires was completed and returned.

With the research and writing mostly completed for the named chapters above an exhaustive process of argument refinement, consolidation of findings and conclusions and quality control ensued. This required several editorial processes to ensure clarity, brevity, coherence and integration. Once completed, the researcher submitted the dissertation for supervisor review which resulted in more refinement and finally professional editorial treatment.

[67] See https://www.surveymonkey.com.

4.2.2 Sampling

The first round of potential respondents (16 in total) were part of a purposeful sample. This type of sampling is particularly useful for exploratory and field research (Neuman, 2011). A typical requirement is that the researcher must be in the position to judge the relevance of the selected sample. Neuman (2011: 267) writes that purposive sampling equates to non-random sampling - "… in which the researcher uses a wide range of methods to locate all possible cases of a highly specific and difficult-to-reach population". The selected respondents conform to this description. The document analysis (specifically Chapter 6 of the dissertation) assisted greatly to narrow down the selection.

Typical attributes of these individuals range from specifics relating to appointment, organisational component, expertise, resource control and decision-making authority embedded in these organisational positions. Leadership drives successful KM as was discussed in Chapters 2 and 3 of the dissertation. The sample focussed on the on the executive management level of the SA DOD commonly referred to as the Senior Management System (SMS). The sample thus included rank/appointment levels of Director General, Chief, Deputy Director Generals and one Chief Director. This resulted in a sample of 16 SMS members and constituted the first round of questionnaires.

Leadership and direction of SA DOD resources are initiated and accounted for by this selected sample. This sample of the SA DOD is responsible for the management of SA DOD knowledge. Some expression on the requirement for KM in the SA DOD does exist within the selected sample of SA DOD Level 1 policy and doctrine (JDP20 and DODI43), which provides limited evidence that the SA DOD might be interested in adopting KM as a management practice. JDP20 makes mention of KM in a diagram that summarises the competencies required from personnel at various levels of the SA DOD. Knowledge management is pitched at the executive management level or what is commonly referred to as the Senior Management System (SMS) (JDP20: 12). DODI43 (J4-4) elaborates on the Generic Core Management Criteria, Standards and Criteria for SA DOD SMS and their responsibility towards KM.

It was thus important to learn from this sample about the conceptualisation and management of the resource, whether this is done or not. A specific Chief Director is included in the sample due to the direct responsibility in the drafting of the Defence Review 2015 and its implementation. Because the Defence Review 2015 is a primary source document analysed in Chapter 5 of the dissertation, the researcher thought it prudent to include this appointment in the sample.

During this first round of questionnaires, the researcher purposefully did not engage the selected respondents on progress and intention to submit so as not to artificially raise interest or pressure. The result was only one of the questionnaires returned to the researcher completed by an SMS member that is under command and control of a Chief. Two questionnaires were returned stating no interest. Staff Officers of at least three Chiefs telephonically communicated with the researcher to clarify the requirements for the questionnaire, clearly tasked to complete the questionnaire as delegated. None of these reached the researcher.

Two subsequent rounds of questionnaires were done due to the poor response rate of the first round. These rounds included all SA DOD SMS members as potential respondents. The same poor

response rate was experienced. The findings of these rounds are discussed in the Chapter 7. The very weak response rate reflect any or combinations of the following scenarios –

- The work schedules of the SMS members not allowing time for participation in academic research on the SA DOD.
- No interest by SMS members to get involved in academic research on the SA DOD.
- Possibly perceiving this type of academic research a waste of time.
- Personal Staff Officers to these positions managing the staff work for the SMS members not being responsive enough.
- Personal Staff Officers to these SMS members perceiving this kind of academic research as a waste of time and thus not presenting it to their principles for consideration.

The approach excludes SA DOD operational and tactical level employees that execute possible KM processes knowingly or unknowingly. However, this is deliberate. If there is no executive-level interest or effort to implement and manage knowledge in the SA DOD, it will in all probability no be managed. If there are organisational components that do manage knowledge; this is done without a clear policy, doctrine and strategy mandate derived from legislation or the Defence Review 2015. These initiatives will also lack integration with other efforts for the same stated reasons. One other weakness of this approach is in the fact that the sample immediately excludes the greater part of the executive management within the Defence Sector (defence industries, agencies and institutes) and their understanding and expectations of military KM.

4.3 QUALITATIVE DATA ANALYSIS AND RIGOUR

Analysis of data/information/knowledge is essential for understanding and conceptualisation, necessary to codify qualitative these into - "… conceptual categories to create themes and [or] concepts" (Neuman, 2011: 510). Analysis permits the researcher - "… to improve understanding, expand theory, and advance knowledge" (Neuman, 2011: 507). Analysis is the central activity enabling theory building within case studies (Eisenhardt, 1989). Eisenhardt (1989: 532) goes further by stating that the constructed theory from case study research is - "… often novel, testable and empirically valid". Dey (1993: 31) states that the - "… core of qualitative analysis lies in these related processes of describing phenomena, classifying it, and seeing how … concepts interconnect". Crucial for this dissertation is the creation of seminal understanding of KM by means of rigorous analysis why the SA DOD does not engage in coherent and integrated KM; why and how it should.

Collection methods, the data/information/knowledge and the analysis aim at enhancing the research quality and rigour of the findings. Lee (1999: 154-155) and Yin (2003) proposes four standards for quality, rigorous qualitative research. These are reliability, construct validity, internal validity (not for descriptive or exploratory studies), and external validity (or transferability within a qualitative approach).

Qualitative research reliability is enhanced by using multiple techniques for data collection – such as interviews, questionnaires, photos, document analysis, etc. (Neuman, 2011). As such, the

researcher made maximum use of published KM academic material. Ma and Yu (2010) provided a base of authoritative articles that were considered initially and subsequently expanded on. Adding to the consistency of the research, the literature review material used is in the public domain to ensure the repeatability of the research at any time (Lee, 1999: 148 and 157). The material used for the document analysis in Chapter 6 of the dissertation is not in the public domain. In the short- to medium-term, this material will restrict repeatability. To mitigate this shortcoming the researcher used as much as possible quoted text from these classified SA DOD documents in order to provide maximum original text in support of repeatability SA legislation provides for the archiving and declassification of material over the long-term, which provides complete access in the future. Thus, the research material used in the dissertation is reliable and can be traced and verified.

Qualitative research aims at generating trustworthy, authentic and valid results (Schwandt, 2007; Baxter & Jack, 2008; Marshall & Rossman, 2011; Neuman, 2011). Maxwell (2009: 236), supported by Neuman (2011), is of the opinion that - "Qualitative studies generally rely on the integration of data from a variety of methods and sources of information [such as documents, observation and interviews] a general principle known as triangulation (Denzin, 1970 and Denzin & Lincoln, 1994)". Patton (1990) and Yin (2003) in Baxter and Jack (2008: 554) share this opinion. Triangulation facilitates the convergence of ideas, the confirmation of findings and thus the quality of the data, information and knowledge (Knafl & Breitmayer, 1989 in Baxter & Jack, 2008 and Lee, 1999). Maxwell (2009) states that a triangulation strategy minimises the possibility of only concentrating on the systematic biases or limitations of a specific method to base findings on. Triangulation enables enhanced assessment of the validity and generality of the explanations. Triangulation was used extensively in this dissertation. Triangulation was achieved by means of a literature review on academic theory and practice, a small case study on applied military KM, document analysis of relevant SA DOD documents and a questionnaire with voluntary participation.

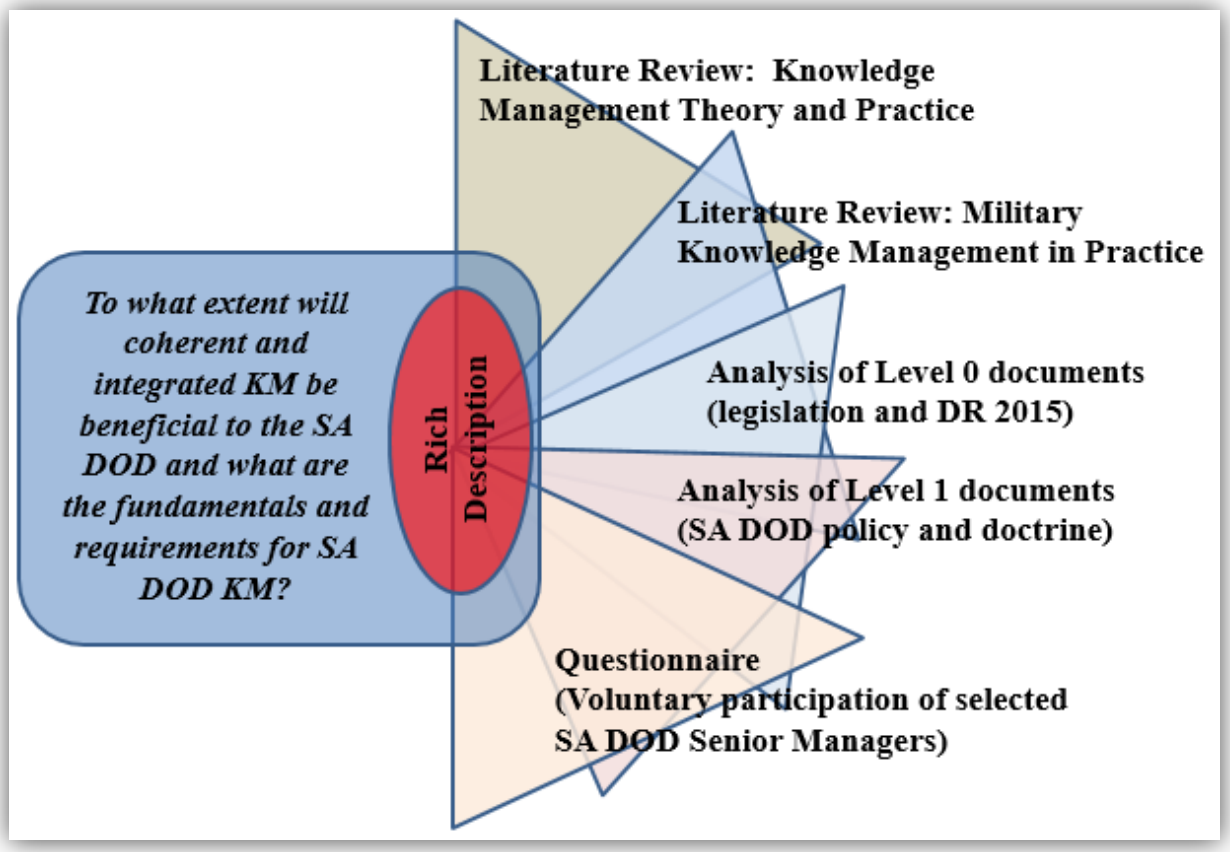


Figure 4.6: Layering and Triangulation

Source: Author's compilation of information.

The various other layers were necessary because of the assumption that the SA DOD is not interested in KM, making research by questionnaire a risky approach. If no or marginal participation is achieved it supports the assumption, however, with no participation, there is also no knowledge gained other than support for the assumption of no interest. Thus, the researcher layered the research for optimum data, information and knowledge availability in support of the research approach and to cement findings and conclusions in. This layering and triangulation are depicted in Figure 4.2 above.

Lee (1999) proposes the construction of sequential logic in support of construct validity. "The reader of a case study research report should be able to reconstruct and anticipate the sequential logic. The clearer and more compelling the logic, the stronger the argument for construct validity" (Lee, 1999: 155). The researcher of the dissertation gradually and meticulously developed the constructs (SA DOD knowledge and KM), commencing with general theory and practice and ending in specific theory and practice based on a knitted pattern of related theories, practices and language.

Flyvbjerg (2006: 227) states that whether knowledge can be generalised or not it should be allowed to contribute to the body of knowledge of a specific subject field - "A purely descriptive, phenomenological case study without any attempt to generalise can certainly be of value in this process and has often helped cut a path towards scientific innovation". Although the findings of this dissertation might be specific to the SA DOD; the fact that militaries internationally subscribe

to the same practices of learning, KM processes and similarities in military culture the findings could be general applicability - at least amongst developing nation's militaries but even amongst militaries in general.

Because of bureaucratic similarities between the SA DOD and the RSA government departments, the findings could be adapted for these departments or hypothesis could be formulated to test for applicability within the RSA government departments. The proposed SA DOD KM conceptual model should show general utility to militaries around the world as well as SA government departments.

4.4 CONCLUSION

Chapter 4 outlined and discussed the research area and unit of analysis followed by the methodological and design aspects contributing to rigour and quality. The research methodology is specifically aimed at the rich description of KM and related theory and practice that currently prevail and that will possibly impact the establishment of a future SA DOD KMC and associated KM. To this end the research was conducted with a relativist worldview, calibrated with a constructivist paradigm. A qualitative research methodology, comprising a deductive reasoning approach and case study research design, was used to structure the research. Document analysis was the primary research technique. The secondary research technique was the use of a questionnaire. The combination of the research philosophy, methodology, design and methods assisted the researcher in the quest to extract new meaning.

The next chapter of the dissertation focuses on the analysis of the legislative framework as an entry point for the SA DOD mandate and policy. The DR 2015 is analysed to shed light on SRQ1-4; concluding with important factors for consideration in Chapters 6 and 7 of the dissertation.

CHAPTER 5

THE LEGISLATIVE FRAMEWORK AND DEFENCE REVIEW 2015: IMPACT ON THE SA DOD FROM THE PERSPECTIVE OF KNOWLEDGE MANAGEMENT

5.1 INTRODUCTION

There is unambiguous recognition of the value proposition of KM for militaries in some foreign countries, particularly the USA (as discussed in dissertation Chapters 2 and 3). However, limited voices of academics and the SA DOD regarding SA DOD KM represents a gap in literature as identified by the researcher's assumption - why the perceived disinterest in KM by the SA DOD? The follow-on question is - is the SA DOD silent on KM in its organisational architecture?

Military policy and doctrine are significant components of the SA DOD organisational architecture because policy and doctrine form the strategic guidance for organisational decision-making and action. Chapter 5 of the dissertation focuses just on SA DOD Level 0 policy. Chapter 6 of the dissertation broadens the scope to SA DOD Level 1 policy and doctrine.

Organisations should not engage in management initiatives without guidance provided via organisational policy. Policy is not only knowledge but knowledge is also central to policy-making. Pee and Kankanhalli (2015: 1), citing several authors, state that - "… knowledge is central to policy making [sic] and public services". If this is the case then much knowledge is encapsulated in organisational policy based on the conversion processes of tacit knowledge into explicit knowledge.

Wiig (2002) in Pee and Kankanhalli (2015: 1) states that - "KM can enhance decision making [sic] within public services, aid the public to participate effectively in policy decision making [sic], build competitive societal [IC] capabilities, and develop a knowledge-competitive work force [sic]". Wiig (1999b: 4) proposes that policy be a KM component - "Broad KM is the systematic and explicit management of knowledge-related activities, practices, programmes, and policies within the enterprise".

La Grange (2006: 42) clearly links the requirement for policy to action - "To ensure that a country remains competitive in the knowledge economy and to manage its national knowledge assets effectively, policy directives are required to encourage innovation, entrepreneurship, technical and scientific development and increased competitive ability". This opinion reinforces the stated importance of knowledge and KM within organisations; articulated in earlier chapters of the dissertation. It also reiterates the importance of organisational policy as the starting point for the establishment of organisational KM capabilities. The opinions of Davenport and Prusak (1998) and La Grange (2006) stated in chapter 2 of the dissertation reiterates the importance of a portfolio of actions or products required for KM – i.e. policy, routines, processes, practices, norms and documents. These are also part of the IC paradigm. Other important KM requirements are a strategy, funding, people and technology as were identified in Chapter 2 and 3 of the dissertation.

The SA DOD, as an SA governmental department, is distinctly mandated to provide security and defence services/products to the government (as elected by the SA citizenry) in support of security and development imperatives (Sections 199, 200(2) and 204 of the Constitution). These

imperatives are described by legislation and departmental level policy and other documents. One such SA DOD document states –

> "Level 0 – Government Policy. This includes the Constitution, legislation and regulations issued by Ministers in terms of Acts of Parliament, White Papers, position papers, Cabinet decisions and Ministerial direction to the DOD – all such policy is obligatory on the DOD". (SANDFP4, 7)

Thus, national legislation and the DR 2015 are regarded as SA DOD Level 0 policy. This is the focus of analysis for Chapter 5, based on the introduction above and stated opinions thus far. Simply stated; no KM policy, no KMC.

The DR 2015 forms the capstone strategic direction document to SA DOD decision-makers and -executers alike, as well as SA DOD stakeholders, on how best to allocate and/or leverage national defence resources in order to provide services and products in the national interest. The DR 2015, in turn, is based on national legislation and other SA DOD IC (e.g. policy, doctrine, intelligence and IP); thus expressing an integrated SA DOD policy position on the future of the SA DOD as an instrument of national security. Chuter (2011) raises the following opinion in the DR 2015 (0-5) – "… defence policy is the process of maintaining, coordinating and employing the assets of the defence sector so that they contribute optimally to the nation's security policy goals". The DR 2015 states the *raison d'être* of the DR 2015 as follows -

> "In essence, national defence policy defines the strategic intent of government regarding Defence. Therefore, a country's defence policy, given these characteristic features, must be subjected to periodic review and update so as to reflect factors that have influenced a change in Government's guidelines for the defence function." (DR 2015: 0-6).

> "The Defence Review takes its lead from the national security construct, national posture and national interests. This is augmented by South Africa's foreign policy obligations and aspirations. The Defence Review draws on the Constitution and other Statutes, establishes fundamental principles and tenets and cascades these to a future-orientated, concept-driven, effects-based defence policy and strategy." (DR 2015: 0-6).

The DR 2015 details the projected South African defence futures based on the development visions of five strategic SA DOD milestones. These stretch over a period of three Medium Term Strategic Framework planning cycles (approximately 20 years). The researcher analysed the DR 2015 to extract views on possible future SA DOD KM initiatives and activities, types of knowledge to be managed and which components are critical for an SA DOD KMC. The DR 2015, over the coming years, will inform revised and new SA DOD policy, which in turn will inform decisions, actions, effects and advantage.

For the purpose of Chapter 5 of this dissertation, relevant SA legislation and the DR 2015 were analysed for evidence of interest in KM, the importance of KM, types of SA DOD knowledge, KM activities and requirements to answer the research questions. These capstone knowledge documents provided answers to the 'who' and 'what' questions and provided clues as to the desired effects[68] sought. These capstone documents all aim to facilitate decision-making, action, effects and advantage. Thus, the researcher is now stepping away from academic and other military views

[68] "Effect. (n) The result or consequence of an action". (JWP1: 9-4)

on KM and is focussing on SA DOD KM - albeit from an SA DOD Level 0 policy perspective. Chapter 6 of the dissertation will broaden the scope of the analysis to SA DOD Level 1 policy and doctrine.

Before the researcher commences with the analysis of the DR 2015, the SA DOD and its mandate are unpacked from a legislative perspective to provide the origin of possible KM policy requirements. Thereafter, the analysis of the DR 2015 provides detail verifying the assumption that the SA DOD is not interested in KM and why the SA DOD should be and what knowledge should be managed. Let us commence with considering relevant SA DOD legislation concerning aspects already discussed thus far that relates to the knowledge continuum and KM, with the working definitions for knowledge and KM in mind.

5.2 THE SA DOD REGULATORY FRAMEWORK

> *"The Defence Force will be subject to the Constitution, national statutes, national policy and the national regulatory framework"* (DR 2015: 0-7)

5.2.1 Constitution of South Africa 1996

The 1996 Constitution enshrines the freedom of expression, access to information and academic and research freedoms. Section 16 and 32 of the Constitution recognise the importance of information to State and society. Notably, access to knowledge and the use thereof was not included probably because, at the time of the drafting of the RSA Constitution (1996), South Africa was still firmly in the grip of the information age.

Section 195 of the RSA Constitution (1996) provides an array of principles for public administration (which is also applicable to the SA DOD as a government department). Section 195 highlights the effective, efficient and economic resource usage, focus on development and the importance of transparency based on information that is accessible and in-time as well as Human Resource Management (HRM). Thus, Section 195 of the Constitution (1996) enshrines the idea of efficient, effective and economic development through the exploitation of accessible information and human potential (amongst other things). Although it is not stated explicitly, the expression 'human potential' includes capabilities such as wisdom and knowledge, the development and use thereof.

Interestingly, the word 'knowledge' is only referred to four times in the Constitution (1996). Twice; knowledge is required for specific administrative positions (Auditor–General and Commissioners of the Public Service Commission) (Section 193 and 196). Twice; knowledge is required for the Presidential and Deputy President oath or solemn affirmation (Schedule 2, Section 1 and 2). This 'knowledge' is personal knowledge, typically in the tacit domain. No reference is made of information required to do these duties; acknowledging the importance of knowledge – possibly as part of the human potential - in the equation of leadership.

Importantly, the RSA Constitution (1996) legislate the establishment of the single SA DOD and Intelligence Services. The latter allowing for military and security intelligence functions (Section 198-210). Section 200-204 deals specifically with the SA DOD stating that - "(2) The primary object of the defence force is to defend and protect the Republic, its territorial integrity and

its people in accordance with the Constitution and the principles of international law regulating the use of force." (Section 200). These are complex tasks requiring vast knowledge (and possibly even wisdom) to accomplish. Just having access to information will not suffice. The DR 2015 expresses in much more detail how this is projected to be accomplished.

The RSA Constitution (1996) pronounce on the importance of knowledge, albeit non-explicitly. So, the Constitution (1996) provides for the *raison d'être* of the SA DOD and the first stabs for the requirement of IM and KM. The Constitution (1996) also states in Section 32(1)(a) that all citizens have a right to access to State information. This right is, however, calibrated by Section 36 (Limitation of Rights) of the Constitution (1996). From the Constitution (1996) all legislation flows. Some SA DOD germane legislation will be discussed henceforth.

5.2.2 Defence Act 42 of 2002

The Defence Act 42 of 2002 (hereafter the Defence Act) emanates from RSA Constitutional requirements. When understanding the complexity of defence and Defence Forces, as contemplated in earlier chapters of the dissertation, it would be reasonable to expect that a high emphasis will be placed on IM and KM.

However, the word 'knowledge' is only used once in the Defence Act in Section 24(b) – with no relevance to KM. The Defence Act was promulgated in the early 2000s, during the early stages of the emerging knowledge era and the establishment of KM. It thus begs the question; is the SA DOD not interested in managing the required knowledge to fulfil its Constitutional mandate? Or, does the SA DOD regard IM as KM? The latter might be the case. In fact, Section 14.g of the Defence Act states that C SANDF must supply the Sec Def with information about the SANDF as may be required by the Sec Def. This will certainly empower the Sec Def in the execution of the Defence Secretariat mandate, but not as much as knowledge would have. The Defence Act shows clear signs of information age entrenchment.

The Sec Def is the principal defence policy adviser to the MOD (Section 8(b)). 'Advisor' is the noun for advice, which means "Guidance or recommendations offered with regard to prudent action." (Oxford Dictionary: online). This implicitly translates into the transfer of a continuum of knowledge, not just information. It also links this knowledge transfer to action. This knowledge will be based on knowledge gathered from other SA DOD knowledge champions that will be explored later in this chapter and in chapter 6 of the dissertation. Section 14 of the Defence Act 42 states that the CSANDF is responsible for - "(a) is the principal adviser to the Minister on any military, operational and administrative matter within the competence of the [CSANDF]; … (c) is responsible for formulating and issuing military policy and doctrines". This makes the C SANDF a principal custodian of specific types of capstone military knowledge – policy and doctrine. Yet, SA DOD policy formulation and management is the responsibility of Chief of Defence Policy, Strategy and Planning resorting under the Sec Def. Thus, the Defence Act might also suffer from construct dissonance in that it speaks about information but probably have knowledge in mind – taking note of the fact that the document is a product of people that had an information era mindset at the time of writing.

From Chapters 3 and 4 of this dissertation, it is understood that policy, doctrine and intelligence are specific types of knowledge; doctrine, in particular, is generated and managed by

militaries. Intelligence includes both tacit and explicit forms. This is also the case for the SA DOD. Section 14 of the Defence Act pronounces on the management of doctrine, policy (Section 8 & several other places) and military intelligence (Section 32-42). These are, however, not distinctly linked to the construct of knowledge, which would have been useful when initiating an SA DOD KMC. No mention is made of the requirement to manage military related IP, although all of the above are in fact specific SA DOD IP and regarded internationally as capstone military knowledge (not information).

The Defence Act makes provision for the establishment of Defence Intelligence (DI) (Section 33), in accordance with the prescripts of the RSA Constitution (1996) – previously stated. DI is responsible for SA DOD intelligence management, and as such (Section 34) responsible to - "… subject to the National Strategic Intelligence Act, 1994 (Act No. 39 of 1994), gather, correlate, evaluate and use…" both strategic and operational intelligence for the purposes of national security, formulating policy and strategy, ensuring the security of both forces and assets and to support and prepare forces. Intelligence is thus perceived as critical for national security as well as the crafting of capstone SA DOD knowledge documents i.e. policy, doctrine and strategy.

The Defence Act deals with the control over (military related) intelligence; i.e. access to intelligence (or control of specific knowledge flow) within the SA DOD and by other stakeholders. Section 37 describes the various security classification grades for the SA DOD knowledge continuum (data/information/knowledge). Section 38 and 39 outlines the role of the Sec Def in managing security clearances required to access this knowledge continuum. Although DI functionally responsible for RSA military intelligence and counter-intelligence, the Sec Def is indirectly responsible for the flow of SA DOD knowledge continuum products by virtue of security clearances management and being the SA DOD Information Officer (PAIA, 2000: 7). This makes the Sec Def and Chief Defence Intelligence very distinct SA DOD KM role-players.

Section 50 (3) of the Defence Act states - "To the extent necessary for security and the protection of information, members of the [SA DOD] and employees may be subjected to restrictions in communicating any kind of information, and where appropriate, may be subjected to prohibition of communication of information.". Nothing said about communicating knowledge (e.g. policy, doctrine, intelligence and IP), although it is reasonably understood that the statement is inclusive of these classified documents. This begs the question; does the SA DOD regard its capstone military knowledge as information? It is quite possible.

Defence Act (Section 82(g)) makes reference to MOD regulatory control over military intelligence; mostly relating to information security and classification; again no mention of capstone military knowledge. Thus, the MOD also has a distinct responsibility towards facilitating information flow in the SA DOD by means of the information classification regime. However, these functions are typically delegated to the Chief of Defence Intelligence solidifying this position as a critical SA DOD knowledge manager. Defence (Section 104 -19) expresses on information security regarding facilities, installations or instruments of the SA DOD. Again, it fails to mention knowledge (e.g. policy, doctrine, intelligence and IP) security.

Section 104-7 of the Defence Act expresses on illegal access and disclosure of information as addressed by the Promotion of Access to Information Act No. 2 of 2000. This clearly legislates the

security component of SA DOD IM from a counterintelligence perspective. It is a critical consideration for SA DOD knowledge flow and for a future SA DOD KMC.

The Defence Act does not provide any explicit expression of the importance of knowledge or its management. That said, when understanding that militaries regard policy, strategy, doctrine, intelligence, IP, processes, procedures, tactics and techniques as knowledge – then the Defence Act does address types of military knowledge to be managed.

The Defence Act is more specific about who should manage these. As such, the MOD, the Sec Def, CSANDF and Chief Defence Intelligence are pivotal for SA DOD KM due to their distinct responsibilities to manage military policy, doctrine, intelligence and other types of knowledge (IP, strategy, tactics, processes, procedures, tactics and techniques) as specific knowledge generated and managed by the SA DOD (and militaries worldwide). The question is; which of these should be the SA DOD CKO, if any? What is not pronounced on in the Defence Act 42 of 2002 is whether and how defence matériel related IP should be managed – and by whom? Expressions regarding this can be found in the Armaments Corporation of South Africa, Limited Act 18 of 2003 discussed later in this chapter. Concluding, the Defence Act states no requirement for a coherent and integrated SA DOD KMC to engage in this management.

5.2.3 Public Finance Management Act 1 of 1999 (PFMA)

The PFMA is the national legal instrument to regulate the financial behaviour of the SA government. It expresses on the management of State assets (Section 2). Considering that knowledge is widely perceived as a primary strategic asset by both business and militaries, it would be reasonable to expect that KM is addressed explicitly in the PFMA. This is not the case.

If it is accepted that knowledge is an asset, then the Sec Def has a distinct responsibility to manage military knowledge (e.g. IP as both a commercial and military asset) in order to abide by the regulation quoted above requiring State assets to be managed. It would thus make sense that Sec Def manages capstone military knowledge (e.g. policy, strategy, doctrine, intelligence and IP) in support of the Sec Def's role as principle Defence policy adviser to the MOD. The responsibility for the safeguarding and management of assets is further rolled down to all government officials in Section 45 of the PFMA. Thus, knowledge as a State asset should be managed by all SA DOD officials.

The reality is that no explicit statement is made of knowledge or KM in the PFMA. The PFMA pronounces on the responsibilities of departmental accounting officers, in the case of the SA DOD, the accounting officer is the Sec Def. PFMA Section 42 states that accounting officers (e.g. the Sec Def) must in the endeavour to manage assets through inventories. From the literature review of the dissertation, it is clear that KM is much more than inventories of data or information. The PFMA, therefore, does not provide clear guidance on the management of knowledge as a requirement within asset management.

5.2.4 National Strategic Intelligence Act 39 of 1994 (NSIA)

The NSIA was promulgated to define the functionality of RSA intelligence structures that are responsible for the management of South African national intelligence and its apparatus. The act was amended by the National Strategic Intelligence Amendment Act 67 of 2002.

The very title of the legislation alludes to a specific type of knowledge that is managed – intelligence (Section 6a); and/or specific actions – intelligence (Section 6c) and/or counter-intelligence (Section 6d). The legislation mentions the word 'knowledge' twice; out of context for this dissertation. The amendment did not change or add any text about KM. However, the legislation provides much insight on 'intelligence' as a form of capstone knowledge. The NSIA mentions the word 'information' in Sections 1, 2A, 3(3) and 6 in the same sentence as 'intelligence' in a differentiating manner. It is thus clear from the legislation that information is conceptualised differently from intelligence.

The Section 1 of the NSIA provides definitions for a host of types of intelligence. The definitions are mostly focused on the strategic and operational level of government. All the definitions position intelligence as a requirement for decision-making and action. None of the definitions, however, couple intelligence directly to advantage; which, incidentally, is the entire raison d'être for producing intelligence. None of the definitions refers to a data/information/knowledge requirement or utilisation of these. They all just refer to intelligence required or used. However, from the literature review (dissertation Chapter 2) it is known and accepted that intelligence is a type of explicit knowledge and more specifically capstone military knowledge (dissertation Chapter 3) that is produced from data, information and other knowledge through knowledge processes commonly known as the intelligence cycle (dissertation Chapter 2).

Most of the definitions stated in NSIA (Section 1) (as amended) couple the requirement for and use of intelligence to enhance South African national security and national interest and to determine threat perception (departmental-, domestic-, domestic military-, foreign- and foreign military-, national security- and strategic national intelligence) with only crime intelligence posited to be used in investigations, evidence preparation, law enforcement and prosecutions. At least two definitions couple the requirement for intelligence to policy (NSIA, Section 1: 2 and 3). Two definitions state the requirement for intelligence to enhance planning operations (NSIA, Section 1: 2). Time is not prescribed but it can be assumed that the requirement and use are continuous or as required, e.g. during peace or war and current or long-term issues. All the definitions prescribe a specific 'ba', location or geography. Most of the definitions are coupled to threat elimination or neutralisation and safety and security, i.e. the why or the projected required effect. The definitions also state who the recipients of these effects (safety and security of the RSA and its citizens) should be. Who is mandated to conduct IntOps and functions are prescribed by the NSIA 39 of 1994 (as amended)? The NSIA (as amended) provides definitions for three distinct knowledge or intelligence activities, i.e. counter-intelligence, covert collection and evaluation. The definitions thus in broad describe the 'who', 'what', 'where' and 'why' questions. What lacks distinctly is which effect is to be obtained and what thereafter. These as well as 'when' and 'how' detail might be captured in policy, doctrine and procedures within organisations.

Counter-intelligence activities mostly relate to knowledge continuum security and neutralising threat to access. Legislating this knowledge (security) process is significant in the sense that the SA

DOD is obliged to have this process part of any proposed KM system. The MOD, Sec Def and DI are functionally responsible in terms of security clearance as discussed earlier. The DI is further responsible for other physical security techniques. Chief Command Management Information Systems (C CMIS) and DI are responsible for cybersecurity along with other State stakeholders. Counter-intelligence is, in essence, a knowledge security process, with some of the actions or sub-processes discussed in NSIA Section 2A. It is these functions that restrict the flow of knowledge for security reasons. The security regime needs to be balanced with the requirement for the flow of knowledge to facilitate the development of new knowledge and/or actionable decisions.

Covert collection is a specific knowledge process to acquire knowledge continuum products that are particularly well protected physically (which is the knowledge security function) or very difficult to access due to tacitness. There is a secrecy dimension to covert collection, emphasising the security function required for KM. For the SA DOD cover collection are only mandated within specific parameters. That said, it remains a critical task or knowledge process for the SA DOD that is distinctly linked to decisions, actions, effects and advantage.

The NSIA (Section 4(1)(e) states that the SA DOD Chief Defence Intelligence is a member of the National Intelligence Coordinating Committee. Section 2(4) states that -

> "(a) gather, correlate, evaluate and use foreign military intelligence, and supply foreign military intelligence relating to national strategic intelligence to [National Intelligence Coordination Committee], but the [SA DOD] shall not gather intelligence of a non-military nature in a covert manner;
>
> (b) gather, correlate, evaluate and use domestic military intelligence excluding covert collection, except when employed for service as contemplated in section 201 (2) (a) of the Constitution and under conditions set out in section 3 (2) of this Act, and supply such intelligence to [National Intelligence Coordination Committee]; and
>
> (c) institute counter-intelligence measures within the [SA DOD].".

Section 2(4) of the NSIA 39 of 1994 alludes to specific knowledge processes (the 'how' not in the definitions) that are important for intelligence management. These processes ("gather, correlate, evaluate and use") should thus be considered fundamental to future SA DOD KM.

The NSIA thus describes a very specific knowledge continuum. The SA DOD is affected by and deal with all these types of intelligence because soldiers are first RSA citizens and then SA DOD members. The NSIA thus provides firm evidence that intelligence is an important type of knowledge to be managed directly or indirectly by the SA DOD. Concluding, there is no specific mention of knowledge or KM or linkages between knowledge as a strategic asset and intelligence.

5.2.5 Promotion of Access to Information Act No. 2 of 2000 (PAIA)

The Sec Def is the CIO of the SA DOD (PAIA, 2000: 7). The SA DOD has legislated prescripts to have a CIO and thus by implications must manage its information accordingly. The legislation does not allude to knowledge or KM and thus does not express the requirement for a CKO. By implication, the SA DOD might be inclined to only comply with legislation and thus only recognise the CIO and IM and not recognising the requirement for KM and a CKO in order to provide coherence and integration to the SA DOD knowledge continuum.

Another interesting implication of the legislation is that the legislation only seeks to promote access to information. It does not seek to promote access to knowledge. Nothing is explicitly said about SA DOD doctrine and IP. From the discussions in Chapters 3 and 4, it is clear that there are differences between these constructs. By implication, the SA DOD has no obligation to provide access to its knowledge (e.g. policy, strategy, doctrine, intelligence, IP) to the public, which impacts the security requirement for future SA DOD KM. PAIA (2000) does, however, equate intelligence to information (in contradiction to the NSIA discussed above). Discrepancies and dissonance such as this might drive the perception that the SA DOD is not interested in KM.

In short, the Sec Def (in the capacity of SA DOD CIO) controls the information and intelligence of the SA DOD in the interest of the State. In this capacity, the Sec Def is functionally assisted by various SA DOD Divisions, policy and doctrine. This is important for the construction of a future SA DOD KMC.

5.2.6 Protection of State Information Bill

The replacement for the Protection of Information Act No. 84 of 1982 (POIA) is the Protection of State Information Bill, returned by the President of the Republic of South Africa to the National Assembly for reconsideration during September 2013. This act expresses the requirement for information security and by implication knowledge security as discussed above.

5.2.7 National Archives of South Africa Act No. 43 of 1996 (NASAA)

The NASAA 43 of 1996 establishes the functions of archiving knowledge continuum artefacts for the government. The NASAA does not make mention of ‘knowledge’ or KM. However, it does address the management of - “… public and non-public records with enduring value” using a - “… national automated archival information retrieval system” (Section 3 of the NASAA). Some of the definitions provided by the NASAA for public and non-public records are -

> “… 'non-public record' means a record created or received by a private individual or a body other than one defined as a governmental body in terms of this Act or a provincial law pertaining to records or archives;
>
> 'public record' means a record created or received by a governmental body;
>
> 'record' means recorded information regardless of form or medium;”

These definitions only address information and elements of IM. What is problematic from the above is no description is provided for the concept of ‘enduring value’ and that knowledge is not addressed. Records could be archived based on personal views about the value of the document which could contribute to information overflow or to important information/knowledge being lost. It is the researcher’s opinion that the concept of ‘enduring value’ refers to knowledge rather than information and/or data. This opinion is discussed in more detail in Chapter 6 of the dissertation in terms of time value and advantage of knowledge.

That said, the NASAA definition for ‘record’ is based on the construct of information. From the literature review (dissertation Chapter 3) it is clear that information has limited value and it is probably because of this realisation by the authors of the NASAA then that it was decided to

calibrate the construct of information with the concept of 'enduring value'. When combining these two elements the possible product is knowledge.

Within these archived records, all types of military knowledge (e.g. policy, doctrine, intelligence, IP, processes, procedures, tactics and techniques) can be stored. Thus, the SA DOD has a legislated knowledge storage capability and function covering the KM process – storage. Whether it is perceived as part of an SA DOD KMC is unlikely (based on the discussion above and to follow).

The NASAA does provide insight into some processes that would be considered important for KM. These are - "… arrange, describe and retrieve" (Section 5), "Custody and preservation" (Section 11), "Access and use" (Section 12), "… destroyed, erased or otherwise disposed" (Section 13), records classification (Section 13) and - "… microfilmed or electronically reproduced" (Section 13). This management language is very useful in conjunction with the other research in this dissertation in order to understand the fundamental KM processes critical to the SA DOD and already institutionalised. It is also clear that the National Archive is a principal custodian of SA DOD knowledge and thus fundamental to an SA DOD KMC.

5.2.8 Minimum Information Security Standards (MISS) (4 December 1996)

The MISS (1996) is the RSA National Information Security policy. To date, no other national policy has been promulgated. National departments such as the SA DOD takes its cue on information security from MISS (1996), also briefly summarised in Appendix A of the MISS (1996). The document itself only refers to knowledge three times, out of KM context. This is probably indicative why most of RSA government departments are still stagnating in the information era.

The MISS (1996: 8-10, 19, 50) refers directly to - "… intelligence/information", thus making a distinction between the two constructs. From Chapter 2 and 3, it is evident that intelligence is a type of knowledge; making the MISS also applicable to this type of knowledge and not just to information. The MISS (1996: 8-10) provides the security classification regime for RSA government departments' intelligence and information. The security classification regime is used by the SA DOD, i.e. restricted, confidential, secret and top secret classified knowledge continuum artefacts as well as physical artefacts. This classification regime does not necessarily exist in business. Businesses use a more simple classification system classifying documents of importance or that require discretion as 'company confidential', 'confidential' or sometimes 'secret'. The MISS (1996) also describes more practical measures to guard intelligence/information and the responsibilities of national departments or agencies that are responsible for RSA governmental intelligence/information security.

This layered security classification of documents or ultimately the information and/or knowledge of the SA DOD made explicit in one or the other form of media is aimed at restricting the flow of such information and/or knowledge in the interest of national security (first) and military/operational security in parallel. However, it will ultimately hamper KM in its purest form in some way, that is, KM aiming at total freedom of flow of knowledge in order to grow knowledge and facilitate knowing and innovation. Because this is not the primary objective of the SA DOD, information/knowledge flow is restricted in order to protect national and military interests and

operations. Thus, KM in the SA DOD should take these objectives on board when designing an SA DOD KMC. It should also have due regard for the other RSA departments that are mandated to guard the RSA national security. Thus, an SA DOD KMC should encourage integration with other RSA departments responsible for national security and possibly other objectives.

5.2.9 The Armaments Corporation of South Africa, Limited Act 18 of 2003

The aim of the legislation is to provide the regulatory foundation for the existence and functions of the Armament Corporation of South Africa (ARMSCOR). The only instance where 'knowledge' is mentioned in the context of the requirement for "knowledge and experience" is for ARMSCOR Board Members (Section 7).

Section 20 of the ARMSCOR Act 18 of 2003 mentions the safeguarding of information and records (amongst others). It points to the requirement for information security – and when considering the discussion above regarding archiving SA DOD records, it could also imply knowledge security. This is a typical counter-intelligence function.

Section 22 pronounces on the management of IP. Distinctly so, the IP rights are to be managed by ARMSCOR under the direction of the Sec Dec as per the SA DOD/ARMSCOR Service Level Agreement. To manage the SA DOD IP rights, ARMSCOR will have to manage the IP itself. To this end, functional policy will have to be created. This makes the Sec Def the champion of another type of SA DOD knowledge and broadens the scope of his role as the departmental CIO. The IP referred to in the ARMSCOR Act 18 of 2003 (Section 3) relates to - "(a) the defence materiel requirements of the [SA DOD] …; and (b) the defence technology, research, development, analysis, test and evaluation requirements of the [SA DOD]."

5.2.10 Reflection

The legislation discussed above provides no requirement for KM. It is still firmly entrenched in the information era and associated thinking. With the understanding obtained from the legislation discussed above, it is clear that there is a requirement for coherent and integrated KM within government – at least from an asset management and national security perspective. Such a capability will also assist the SA DOD to cross into the knowledge era and associated thinking and mandate the requirement for a KMC. What is explicitly required is the security aspect of SA DOD knowledge continuum artefacts; the structuring of which will require considerable debate in order to establish a balance between security and the objectives of KM. Let us know consider the SA DOD policy framework for evidence of a requirement for KM and actual KM policy.

5.3 DEFENCE REVIEW 2015

> *"Government's defence policy is articulated in the White Paper on Defence and the Defence Review."* (JWP4: 1-6).

The DR 2015 was approved by Cabinet on 19 March 2014 and adopted by the South African Parliament on 4 June 2015. The reason for this review is stated as - "… complex changes in the strategic environment, increasing continental peacekeeping obligations, the need to deepen democracy on the Continent and the pursuit of our national interests have led to a review of our

strategic posture and concomitant policy" (DR 2015: i). The Review is positioned to provide extended long-term SA DOD policy (DR 2015: 0-6) integrated with RSA foreign policy and security strategy (DR 2015: 0-4). This integrated approach is depicted in Figure 5.1 -

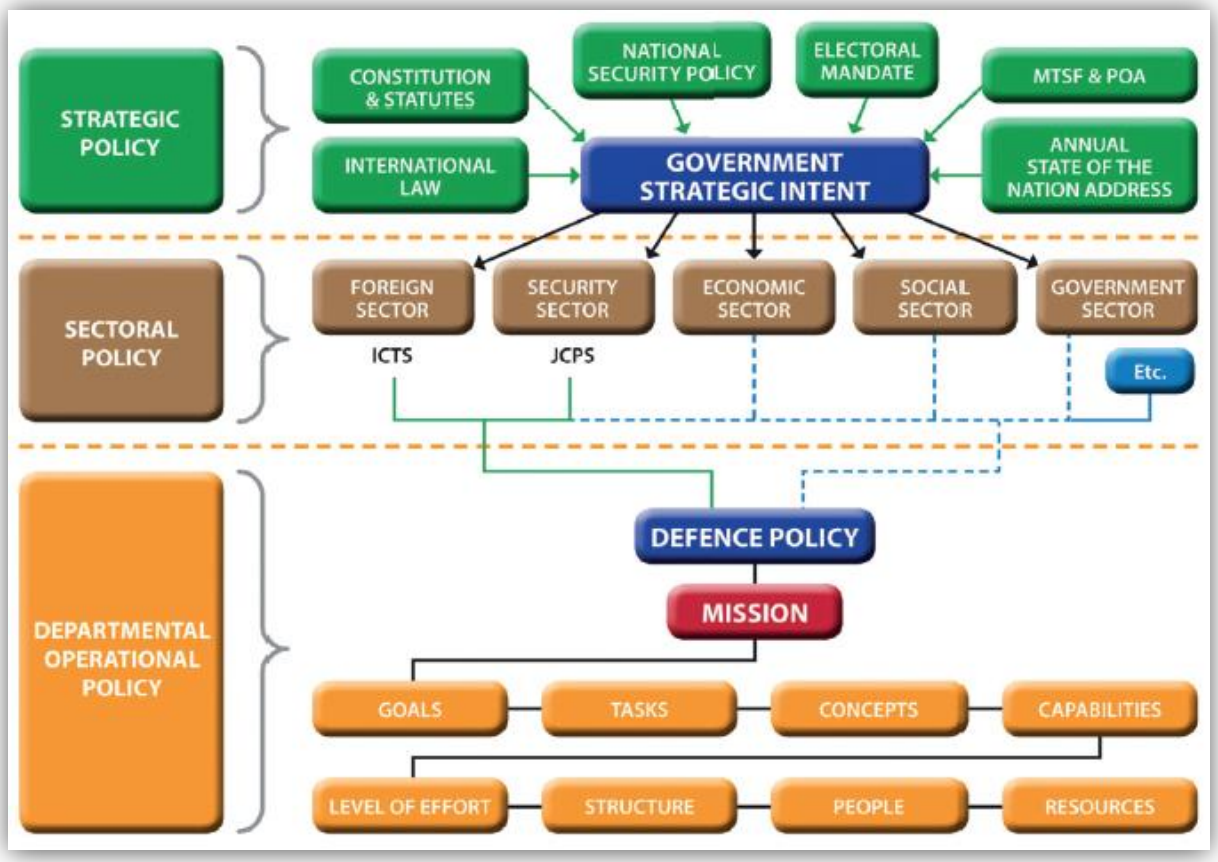


Figure 5.1: Defence Policy within the National Policy Framework

Source: DR 2015 (0-5).

"The Defence Review draws on the Constitution and other Statutes, establishes fundamental principles and tenets and cascades these to a future-orientated, concept-driven, effects based [sic] defence policy and strategy." (DR 2015: 0-6).

At the very basic level of document use, the researcher explored the structure of the document to determine in which chapter and page knowledge and the management thereof is addressed. It was found that knowledge and KM are not addressed in the DR 2015 Table of Content nor the Terms of Reference. Furthermore, the DR 2015 does not define important cross-cutting constructs inherent in the SA DOD knowledge continuum such as data, information, knowledge, intelligence, policy and technology. However, these constructs are used and discussed throughout the DR 2015. Only doctrine and IP are defined. The DR 2015 (0-6) describes the researcher's proposed notion of a knowledge continuum, albeit at an applied level, as – "…the continuum of policy, strategy, force design and structure needed to set a stable long-term defence planning agenda". There is thus evidence of integrated thinking about what is currently acknowledged as the knowledge hierarchy.

5.3.1 Basic Knowledge Management Related Keyword Search and Analysis in the Defence Review 2015

The DR 2015 is silent on KM, yet the construct of knowledge is mentioned 27 times explicitly in the document. The DR 2015 identifies knowledge sharing as an objective in support of South African economic development (DR 2015: 15-17).

The DR 2015 recognises the knowledge (which include SA DOD IP, intelligence, doctrine) hierarchy throughout the document. The DR 2015 makes one reference to the construct of wisdom, separately from knowledge (DR 2015: 11-9). However, the knowledge hierarchy is not mentioned explicitly but the narrative acknowledges the components thereof, albeit iteratively. No mention is made of a continuum of knowledge as discussed in the previous chapters. Based on the discussion in earlier chapters of the dissertation; the document discusses various components of a KMC but does not identify any method(s) with which to accomplish coherence and integration.

The DR 2015 is very vocal regarding the management of data and information. The DR 2015 states that military information is strategically valuable. This corresponds to the expression used by the NASAA 43 of 1996 – 'information of enduring value'. However, this is contradictory to the current academic, business and USA military opinions that knowledge is strategically important and is required for advantage. Very little is expressed on knowledge, providing a clear indication that this construct is not recognised for its strategic value. There is, however, discussion on doctrine, intelligence and IP, which are recognised as capstone military knowledge. Thus, whilst knowledge as a construct is not directly addressed, types of knowledge are directly addressed with policy and management guidance.

There is no mention of a KMC to integrate different types of knowledge being generated, used, shared and managed by the SA DOD. There is only a recurring theme that calls for IM, information- and information systems integration. Let us now consider more detailed discussions on knowledge and related constructs as expressed on in the DR 2015.

5.3.2 Wisdom and Knowledge

The DR 2015 (11-9) recognises a separation between knowledge and wisdom. Warrant officers and non-commissioned officers have different levels and types of tacit knowledge, experience (and possibly wisdom) and that knowledge is important in the development of warrant officers and non-commissioned officers (DR 2015: 11-9 and 11-10). Career planning is the principle enabler to harness knowledge creation, absorption and sharing. Time spent in a rank will impact the level of experience and ultimately knowledge and wisdom (DR 2015: 11-9).

Time is clearly coupled to the development of knowledge if skill and experience are considered building blocks of knowledge (DR 2015: 11-5). Human resource management plays a critical role in knowledge creation, absorption and sharing, therefore the Arms of Service and the Chief Human Resources are critical role-players in the development and management of SA DOD knowledge.

These are all KM aspects that are the responsibility of the individuals themselves but also the Arms of Services career managers as well as the Chief of Human Resources. Without a coherent

and integrated SA DOD KMC, it will be challenging for individuals and the organisation to harness the available knowledge and possibly even wisdom required for decisions and actions.

The DR 2015 fails to recognise the strategic value of knowledge and the development of knowledge within the organisation to enhance decision-making, action, effects and advantage. In this regard, wisdom is also essentially ignored. However, the SA DOD pronounces information as the SA DOD strategic resource based on the concept of information superiority - "Military forces strive to achieve necessary information superiority so as to ensure own freedom of action and to ensure strategic dominance and success." (DR 2015: 6-7). This positions the SA DOD firmly in the information era in 2017 and years to come. From the DR 2015 perspective it is problematic due to the fact that the DR 2015 is regarded as extended long-term SA DOD policy, thus considered the SA DOD future. According to literature and the case study on USA military KM, KM starts or ends with leadership. What is stated by the DR 2015 about leadership and KM?

5.3.3 Leadership and Knowledge

Leadership is an SA DOD functional attribute, as contained in the acronym POSTEDFILT(B) – (personnel, operations, sustainment, training, equipment, doctrine, facilities, information, leadership, technology and budget). The acronym is only mentioned in the List of Acronyms (DR 2015: xxxi) and not again in the document. The various elements clustered in the acronym are, however, discussed throughout the document. Note also that knowledge is not contained in the acronym, only doctrine and information. Even more interesting and distressing is that intelligence is not contained in the acronym. These issues will be discussed later in this dissertation.

The DR 2015 (11-1) describes a distinct link between leadership, knowing and knowledge, but no mention is made of KM leadership or its links with mission command. Transformational leadership is prescribed as a particular leadership style that should be pursued by the SA DOD (DR 2015: 11-1). This will have a specific impact on how SA DOD knowledge will be managed in terms of knowledge sharing and will thus impact the SECI cycle (or knowledge transfer and transformation) within the SA DOD.

Leadership is subject to education, training and development which in essence is knowledge and skill transfer, thus recognising the requirement for a particular type of knowledge transfer and knowledge curricula (refer to the discussion on a broad liberal education combined with military sciences later in the dissertation) to develop SA DOD leaders. The factor of time in rank is emphasised, alluding to the fact that knowledge development takes time; in line with academic views expressed in the literature review about knowledge time value.

The DR 2015 (10-3) identifies policies, doctrine, procedures and processes as C2 capabilities. Command and control and military leadership is symbiotic and embodied in the military construct of mission command. Leadership is a key component of KM according to literature and the USA military. Thus for military organisations, C2 capabilities should be a key component of a military KMC. If the SA DOD C2 doctrine is not carefully crafted it could inhibit knowledge processes (such as understanding and sharing) and thus inhibit decision-making, action, effects and advantage.

The DR 2015 (10-4) links C2, unity of effort, doctrine, interoperability and leadership in a cause and effect relationship. If doctrine is capstone military knowledge that enables the other

elements, then it is critical for the SA DOD to employ a KM capability to ensure the meaningful evolution of doctrine in a quest to remain relevant. Doctrine, as capstone SA DOD knowledge is a key requirement for successful military leadership and interoperability (amongst other military concepts).

The DR 2015 expresses in various sections on SA DOD knowledge stakeholders and role-players. The responsibility for the management of SA DOD knowledge is widespread when considering the types of SA DOD knowledge that is managed. The following role-players are specifically identified or implied: Chiefs of Arms of Service/Combat Services, Chief Human Resources, Chief Defence Matériel, Chief Defence Scientist, C DI, Defence Academy (DR 2015: 11-4, 11-8, 11-13 and 11-16), Chief Logistics, planners, policy managers and the defence industry as a primary stakeholder/role-player in military knowledge (DR 2015: 15-5). Also, specific SA DOD knowledge resides with the SA Defence Industry (DR 2015: 15-12). Specific leadership is required by these role-players and stakeholders to ensure coherence and integration. This can possibly only be achieved if the SA DOD appoints a CKO as the central functionary for SA DOD KMC.

Thus, against the background of the assessments above of the current knowledge about leadership, C2, mission command and KM; the researcher suggests that the SA DOD should adopt the following KM leadership philosophy - the art of knowing and the science of managing knowledge to obtain and sustain advantage. This is based on the philosophy of mission command – the art of command and the science of control.

Thus, for those that survived and strive to win, they have mastered the art of knowing (based on the wisdom of Sun Tzu in Giles, 1910 as discussed in Chapter 3 of the dissertation). The researcher suggests that to sustain survival and winning; the science of managing that knowledge is paramount.

5.3.4 Education, Training, Development and Knowledge

The DR 2015 pairs knowledge with a broad liberal education and military sciences. These represent knowledge-bases or -types to be transferred to military learners (DR 2015: xxxv and 11-3). There are links between a broad liberal education and professional military education; thus setting the tone for types of knowledge to be created, shared and managed. Occupational specific knowledge is identified to be developed through the professional military education system. (DR 2015: 11-4)

Knowledge is identified as an effect of ETD (DR 2015: 11-3). Education is considered to be driven by knowledge processes, typically referring to SECI-type processes (DR 2015: 11-3). The DR 2015 establishes clear links between ETD and knowledge and between knowledge, credibility and professionalism. The DR 2015 (11-4) links knowledge to professionalism. Clear links are also established between ETD and doctrine (DR 2015: 11-2 and 11-6), epitomised by the SA DOD axiom - “We train as we fight” (DR 2015: 4-2).

Education to develop leaders is important. The latter part of Task 1 (Deter and Prevent Conflict) lists curricula involved with training, technology and doctrine (DR 2015: 5-2) as important sources of knowledge with which to accomplish Task 1. Without the appropriate military

knowledge, education becomes a challenge. The Defence Academy is a key enabler to develop, share knowledge with future SA DOD leaders and also to manage knowledge (DR 2015: 11-8, 11-13 and 11-16). The knowledge imparted should enable officers to manage the complexities of personal and professional life.

Training knowledge is linked to military action in the SA DOD axiom - "We train as we fight" (DR 2015: 4-2). Training in the SA DOD is based on a broad liberal education, military science, training curricula and the personal skills and attributes contributed by the mentors, trainers and educators. Thus, training is based on knowledge, yet military and related organisational knowledge are not highlighted as the primary resource for military ETD in the SA DOD, making it difficult to recognise that military knowledge is the SA DOD's strategic advantage and not information. This also complicates the integration of the various types of military knowledge required to provide the most comprehensive knowledge artefacts to base decisions, action, effects and advantage on.

An implication of 'we train as we fight' is linked to action and the requirement of knowledge to be able to 'train' and 'fight'. There are clear interdependencies between training, action, and doctrine (DR 2015: 11-4). There is a distinct requirement for doctrine to be translated into action, thus supporting the idea that knowledge is not an end in itself but that organisations generate and manages knowledge (such as doctrine) to facilitate action. Action is taken to create certain effects according to the RMA which set in motion a continuous cycle of decisions, action and effect. If these are based on knowledge instead of just information the cycle could possibly result in advantage which in turn will lead to a different set of decision, actions and effects.

If we can assume that the best training results will be produced by basing training on military knowledge rather than just data and information, then it can be assumed that training knowledge is a key to military action (or fighting). Action based on just information or data will produce lesser or possibly undesirable outcomes or effects. Action based on knowledge (and if possible integrated knowledge) should render far superior decisions, which will lead to superior action and military effects. These issues of cause and effect are initiated by creating new meaning using knowledge processes in order to provide enhanced decision-making, action, effects and advantage, and are central to defining KM for the military environment. In fact, the DR 2015 (11-6) recognises that the application of doctrine in operations leads to new knowledge (experience) which contributes to the evolution of doctrine (new meaning is created and thus, new knowledge comes into being). New knowledge (or doctrine) as a result of learning from operations must be institutionalised by means of the ETD to ensure the relevance of the SA DOD soldier in future operational contexts. This highlights the requirement for integration between doctrine development, ETD and operations – and emphasises the SA DOD requirement for a coherent and integrated KMC.

The DR 2015 (11-4) identifies the Defence Academy as a primary role-player in the research and development of military doctrine. For this, a Doctrine Branch should be established. The Doctrine Branch will be further capacitated by the Centre for Military Studies to provide the SANDF with a doctrine research and development capability (DR 2015: 11-5). These are primary role-players in SA DOD KM.

The DR 2015 (10-7) requires the SA DOD to be - "Intellectually agile to understand the evolving strategic situation and derive from it the key implications for South Africa; …

Continuously evolving its concepts, doctrines, organisation and training to keep ahead of developments;…". This expresses the requirement for continuous knowledge creation and sharing in order to know and to be able to interpret and understand so that decisions and actions can be taken. This can only be achieved if the SA DOD IC is managed with a KMC.

5.3.5 Experience, Skills Development and Knowledge

The DR 2015 (11-5) identifies a requirement for a balance between knowledge (to know) and skills (to do or action) which is consistent with 'we train as we fight'. This implies that the SA DOD should place emphasis on KM and skills development. Without KM, skills development will remain a challenge due to the absence of a coherent and integrated capability that could assist with the conversion of knowledge into skill and skills into knowledge. This all takes a certain amount of time, and to gain experience in a particular skill takes even longer. The DR 2015 (10-8) acknowledges that it takes time to develop knowledgeable officers and non-commissioned officers, which is a short-term vulnerability of the SA DOD. This vulnerability could be lessened with the establishment of an integrated SA DOD KM capability that manages the entire knowledge continuum coherently.

5.3.6 Types of Knowledge

There is a range of knowledge types within the SA DOD. The range of knowledge types corresponds to the recognised profession of arms knowledge (DR 2015: 11-4). This knowledge is made explicit, typically in categories of capstone military knowledge such as (and corresponding with the USA military thinking on defence knowledge) policy, doctrine, intelligence, IP, procedures, tactics and techniques. Other categories may be discovered when a comprehensive knowledge audit is done. These should be considered capstone SA DOD knowledge. Within these categories of capstone knowledge, several subject fields co-exist and evolve as types of military knowledge, both academically and functionally, based on the broad liberal education philosophy tabled in the DR 2015.

Although not specifically stated, the breakdown provided by the attribute acronym POSTEDFILT(B) (DR 2015: xxxiii) alludes to some key knowledge domains to be managed, with information and doctrine mentioned separately. Doctrine is considered capstone military knowledge, thus providing some recognition of the knowledge hierarchy. What is missing from POSTEDFILT(B) is policy, intelligence and IP (both being capstone military knowledge that enables enhanced decision-making, action, effects and advantage). Open to interpretation – does information, doctrine and/or technology in POSTEDFILT(B) includes constructs such as data, policy, IP and intelligence? Because the DR 2015 acknowledges in several places that there is a difference between data, information, IP, doctrine, intelligence and knowledge – then the POSTEDFILT(B) acronym is very limiting in that it only addresses doctrine as capstone military knowledge and some other SA DOD resources (information).

The DR 2015 (6-5) expresses on the role the SA DOD has to play in national key point related information and IP, making a distinction between the two constructs and identifying specific knowledge to be managed. Several types of knowledge are identified by the definition of SA DOD IP (DR 2015: DR 2015: xxxv and 15-16). The definition identifies IP covering data, information and knowledge as found in or codified as part of different artefacts. Yet, IP is not included in the

POSTEDFILT(B) acronym. The DR 2015 (13-6) identifies the Defence Force Establishment Tables as a specific knowledge artefact being managed by the SA DOD. This document informs another strategic document, Defence Macro-structure that provides distinct insight into SA DOD Force Structure Elements.

The DR 2015 mentions in several places different types of knowledge to be developed in support of its defence and security mandate, being knowledge of culture, customs and languages (DR 2015: 2-19). These types of knowledge are not further described. The DR 2015 (2-19) also identifies knowledge of weapons and knowledge of systems. These can be subdivided into own weapons and systems and knowledge of foreign weapons and systems that are typically the subject matter for capstone military knowledge artefacts and training material. It can be assumed that these will be closely associated with the SA DOD's areas of operations and interests.

Military Sciences is mentioned in the DR 2015 (xxxv and 11-3) as the knowledge that should be taught as part of a broad liberal education of SA DOD personnel. This forms part of the ETD discussion above. The types of curricula or knowledge to be shared and developed in future by the Defence Academy are in sciences and humanities; based on recognised academic professional military curricula (DR 2015: 11-16). The DR 2015 (11-16 and 17) outlines the (future) Defence Academy curriculum to include subject matter on the following knowledge domains within Military Science: Military History, Political Science (International Relations), Strategic Studies, Broad legal studies (including military Law, International Humanitarian Law, criminal procedures and law of evidence), Military Sociology, Mathematics or Applied Military Mathematical Literacy, Defence Resource Management, Public Administration, Military Geography and Aeronautical Science or Nautical Science (as a choice and depending on the future employment of the officer cadet). It implies that graduate military officers will possess various combinations of tacit knowledge on these knowledge domains for application within the SA DOD and during operations. Without coherence and integrated KM much of this tacit knowledge could remain dormant, which is neither cost-effective nor efficient and will therefore not contribute to enhanced decisions, actions, more accurate effects and advantage.

The DR 2015 identifies Defence Attachés as a particular function that will require specific and well developed broad military knowledge (DR 2015: 2-19). Specific knowledge that the Defence Attachés should have absorbed or internalised, over and above functional military knowledge, relates to foreign policy, defence diplomacy and international objectives (DR 2015: 7-6 and 10-5). This corresponds to the proposed broad liberal education (DR 2015: xxxv) and the curricula discussed above. Coherent and integrated KM could provide mechanisms to better guarantee that candidates with the correct profile and aptitude are identified during Defence Academy studies, allowing for optimised career path development, mentoring and knowledge transfer.

The SA DOD (SA Navy) is mandated to manage hydrographic knowledge and the associated artefacts (DR 2015: 8-2). The DR 2015 (8-2) mentions the following knowledge artefacts relating to hydrography as - "... the consolidation of navigational, hazard or maritime warning data into regular formal navigational safety publications or promulgation as Navigational Warnings or Notices to Mariners … Tide Tables for South African and Namibian harbours". This knowledge is critical for both the South African and the international seafaring community's safety. Knowledge integration

with external stakeholders and role-players is thus crucial. This could be managed by an SA DOD KMC.

The SA DOD employs personnel in the form of Specialist Reserves that have particular tacit knowledge, skills and experience that could be useful to other national departments (DR 2015: 8-12). A particular example relates to medical and engineering knowledge. An example currently in practice is SA DOD personnel that were transferred to the RSA Revenue Service to assist with customs and excise duties. Another specialist skill with a possible national, cross-functional, application is the skill of tracking, as might be applied to tracking rhino poachers in cross-border nature reserves such as the Kruger Park. Without an SA DOD KMC knowledge and skills might be lost or difficult to locate to the detriment of the broader SA society.

Specific knowledge that should be developed within the Defence Science, Engineering and Technology environment is knowledge about technology support and upgrades (DR 2015: 10-7). This is in support of discussions above about weapons and systems knowledge to be developed. Specific knowledge domains outlined in DR 2015 (15-7) are -

> "[C2]; information warfare [IW], at all levels of war; Secure communications; [IT], including data fusion technology; Intelligence-gathering sensor, analysis and evaluation technology; Target acquisition and identification technology; Unmanned systems (aerial, ground, surface and under-water); Missile and wider guided munitions technology; Night and poor visibility observation and engagement technology; [EW] technology; Rugged tactical vehicles optimised for operations in the African theatre; Mine and [Improvised Explosive Devices] detection and protection technology; Long-range artillery, precision bombardment and point target engagement systems; Chemical, biological and radiological defence, including the manufacture of military carbons and canisters; Battlefield medical care optimised for the African theatre of operations; and Modelling and simulation.".

These are mostly detail packed into 'technology' in POSTEDFILT(B). The knowledge basis for these knowledge domains (described as technology domains by the SA DOD) are typically contracted by ARMSCOR, the Council for Scientific and Industrial Research (CSIR) and the Defence Industry (DR 2015: 15-3). SA DOD KM could contribute immensely to the coherent and integrated management of knowledge requirements stemming from operational requirements, lessons learned during operations and competitive edge technologies. It could also assist with the leveraging of IP in the international market to generate new knowledge and advantage or to simply drive down units costs due to the possible economies of scale.

The DR 2015 separates logistics knowledge from logistics doctrine, implying that there is a difference (DR 2015: 14-6). In order to illuminate construct dissonance, it would be helpful to detail these differences by means of an authoritative, configuration controlled, taxonomy. An SA DOD KMC can assist with this task.

Other specific knowledge mentioned are applied science of educational technology (DR 2015: 12); local knowledge for prosecutors working in and for the SA DOD (DR 2015: 12-2); information system IP and communication system IP (DR 2015: 14-23); government policy as a primary form of direction to prospective contractors (DR 2015: 15-13) and technical and scientific advice as a distinct knowledge to be accessed in the Defence Industry (DR 2015 (15-22). Let us now consider

expressions on categories of capstone military knowledge and types of knowledge contained in them for insight into SA DOD KM challenges, options and prospects from an SA legislative and Level 0 policy perspective.

5.3.6.1 SA DOD Policy

Much is said about policy in the DR 2015, primarily because it outlines the Defence Policy for the future SA DOD. Aptly, the DR 2015 states that –

> "Defence policy is thus understood as that body of public policy that a government pronounces as its guidelines for the defence objectives and functions of its armed forces. To this end, defence policy defines the defence or military scope of national security, the strategic posture, defence capabilities, defence alliances, and security institutions or mechanisms (both national and international) that govern the utilisation of the Defence Force. The national defence policy also clearly identifies the possible threats to a country's national security and its society, economy, territory and environment, and provides options to government on how the Defence Force should deal with such threats." (DR 2015: 0-6).

It is thus clear that the SA DOD policy is capstone knowledge that sets the means for navigating complex and changing environments within the time frames and means available in the national interest. It is within this body of knowledge that the researcher is searching for evidence of interest in KM and possible fundamentals to a future SA DOD KM capability. "In essence, national defence policy defines the strategic intent of government regarding Defence." (DR 2015: 0-6).

5.3.6.2 SA DOD Intellectual Property

The SA DOD IP ownership and management regime is established by the DR 2015 (15-16 and 15-17), hence the requirement to manage this type of knowledge. This stems from the ARMSCOR Act 51 of 2003. SA DOD IP is considered a specific type of knowledge. SA DOD IP is typically developed within the acquisition and procurement programmes; through research and development programmes and/or from defence industrial programmes. ARMSCOR and Defence Matériel Division thus have a prominent KM role for the SA DOD. This identifies Chief Defence Matériel and the Chief Executive Officer of ARMSCOR (DR 2015 (15-17) as key SA DOD knowledge managers. The ARMSCOR Chief Executive Officer is responsible for the management of SA DOD IP, in fact, the ARMSCOR Act mandate ARMSCOR to be the custodian of SA DOD defence materiel related IP. The Chief Defence Scientist is another SA DOD knowledge manager, linked to the establishment of the Defence Science, Engineering and Technology capability (DR 2015: 10-7, 15-9 and 15-10). This begs the questions then – is the Sec Def/ARMSCOR Chief Executive Officer, Chief Defence Matériel or Chief Defence Scientist to be the CKO of the SA DOD or are they just the custodians of particular SA DOD type knowledge that should be included in the portfolio of an appointed CKO?

The DR 2015 (15-16) states the importance of and several processes for SA DOD IP management (both back- and foreground commercial IP). These are the management of ownership, creation, use, transfer, licencing, modification, altering, development, amendment, enhancement, registration of patents, royalty or revenue stream management, sale or leveraging, loss, disposal, dispute settlement of various kinds, conventional arms control requirements and security. Considering the literature review, these are all KM processes or some form of variation/semantics

to those mentioned and recognised by scholars and businesses alike. These will require a broad scope of functional expertise which in turn will require integration in order not to duplicate functions that will lead to inefficiencies and wastage.

The primary decision-makers about the management of sovereign or strategic SA DOD IP are the MOD, Sec Def and ARMSCOR Chief Executive Officer (DR 2015: 15-17). Some of the Sec Def responsibilities have been delegated to Chief Defence Matériel. CSANDF is not recognised as a primary decision-maker regarding the use of SA DOD defence matériel related IP. However, CSANDF is a primary stakeholder in the management of SA DOD IP due to the impact it has on the defence's capabilities under his/her command.

The DR 2015 (6-5 and 15-12) emphasises the requirement for security of information and IP. If IP is regarded by business as strategic knowledge, then by implication the security of this kind of knowledge is paramount. The security of specific defence matériel related IP is linked to the sovereign ownership and control of the IP by the SA DOD, thus implying a particular level of security measures, both physical and contractual. Contracting is perceived as an important method to secure IP (DR 2015: 15-16). A future SA DOD KMC should thus have a firm grasp on contracting models. ARMSCOR, as the SA DOD contracting agency, must provide contracting services. This makes ARMSCOR a very important role-player in SA DOD KM.

SA DOD IP management is guided by SA DOD policy, contracts and possibly patenting. Security of SA DOD IP based on possibilities of patenting is highlighted. Specific protection measures of IP to be considered are the maintenance of trade secrets and other national secrecy and security provisions (typically related to information security as having been discussed above and found within legislation) (DR 2015: 15-17). Contracting is perceived as an important method to secure IP supplemented with a trade secret regime. These are thus regarded as important management tools and processes for the management of knowledge in the SA DOD. Other paragraphs of the DR 2015 (15-16) provides for IP classification into the foreground- or background- or historical IP which is important for contracting and ownership.

SA DOD IP stemming from defence technology development can be created as a result of SA DOD matériel acquisition and/or procurement programmes or by means of Defence Science, Engineering and Technology initiatives and/or Defence Industrial programmes stemming from the named activities. Within these programmes, IP will be created through the investment of State funding in research and development and/or product development. Detailed SA DOD policy, contracting models, possible patenting and bilateral arrangements with foreign countries and their militaries are utilised to acquire and control SA DOD IP based on the interaction between the SA DOD, ARMSCOR, the Defence Industry and foreign entities (foreign militaries and their defence industries and technology development organisations). (DR 2015: 15-16). This complex commercial and military interaction that involves the creation, utilisation and sharing of IP provides a very clear business case for SA DOD KM. In fact, the DR 2015 (15-16) expresses this requirement as - "… The above places the burden on the State to ensure significant rigour concerning the management of defence [IP] in future defence matériel contracts.". With the above in mind, the DR 2015 defines SA DOD IP as -

> "Any [IP] that is created exclusively or partially with defence funds, and may be found in, or take the form of, books, manuscripts, reports and notes, computer software, inventions, drawings

> and designs, data items, data packs, specifications, models, photographs, trademarks and other graphical images. [DR 2015: xxxv and 15-16] Defence [IP] includes [IP] that is created through indirect contracting, such as contracts made by the other party with a sub-contractor, as well as [IP] that is obtained or created exclusively or partially through the [Defence Industrial Participation] programme or other contracts or co-operations [*sic*] of the [SANDF] with foreign entities or countries, where the Defence Force and/or the other party are legally entitled to the [IP]". (DR 2015: 15-16).

The definition provides clarity as to what is considered IP and names several artefacts. These are, of course, primarily the result of acquisition, technology development, research and development and procurement initiatives. Hydrographic services and intelligence will also render IP artefacts. They can be found throughout the SA DOD in the various Arms of Service and Divisions, making Chiefs of Arms of Service and Divisions responsible for components of a future SA DOD KMC. Furthermore, the scope of this definition highlights the requirement for a coherent and integrated SA DOD KMC if any enduring value and advantage are going to be created.

The DR 2015 (15-16) states that the SA DOD will own (fully funded) or co-own (partially funded) defence matériel and/or technology developed related IP as funded by the SA DOD - "… unless specifically ceded to another body or person, regardless of any patents that may be lodged". Contracting that is designed around control, ownership and use of SA DOD IP must express on - "… the required levels of sovereignty and secrecy, the use of background technology, the future transfer of such intellectual property and the matter of royalties.". The SA DOD does not divest itself of any owned or co-owned IP except where such a business case is approved by the MOD. As a rule of thumb, the SA DOD does not patent IP due to the cost implications and security concerns over the explicitness of the knowledge control, ownership, military operational advantage and industrial advantage. The SA DOD does, however, support the principle of maintaining trade secrets (DR 2015: 15-17) by means of rigorous counter-intelligence measures.

Supporting the establishment of an SA DOD KMS is the fact that royalties can be earned through the leveraging of SA DOD IP (DR 2015: 15-17). Such practices are also prescribed by the PFMA 1 of 1999. There should thus be SA DOD policy on IP exploitation, which is another building block in a KMC.

Because IP is considered an SA DOD intangible asset it forms part of the SA DOD asset management regime from an accounting perspective – making the Chief of Logistics an important role-player in SA DOD KM. When IP is considered for leveraging, several other role-players are involved i.e. the defence industry and ARMSCOR and National Conventional Arms Control and associated national governmental departments. When considering software IP, State Information Technology Agency (SITA) becomes an important role-player. These are all important role-players and stakeholders in a future SA DOD KMC, either directly or indirectly.

Lastly, both IP and intelligence are identified as two key priorities for defence diplomacy initiatives (DR 2015: 7-2). Both these have been identified in the literature to be knowledge with a particular strategic value to organisations and are regarded as capstone knowledge. Both are mentioned because intelligence can be IP and vice versa, depending on the context.

5.3.6.3 SA DOD Intelligence

The DR 2015 (3-11) identifies defence intelligence as a key enabler to anticipate change. Intelligence is thus a key enabler to the cycle of decisions and actions that follows anticipated a change in the quest to dominate the OODA loop. Consider the following from the DR 2015 (3-11) -

> "Defence must be able to effectively contend with a more complex, rapidly changing world through timely collection, processing and dissemination of actionable intelligence in order to accurately anticipate and respond appropriately. This requires strategic awareness and the restoration of an effective defence intelligence capability that provides integrated information acquired through liaison with allied and friendly forces, local human intelligence and the use of static and mobile sensors for enhanced military decision-making. This must be pursued at the strategic, operational and tactical levels.".

In the quote above the DR 2015 uses information and intelligence interchangeably, creating the impression that information is equal to intelligence, which of course it is not.

Some intelligence processes are mentioned above. These are collection, processing and dissemination. If intelligence is equated to a type of explicit knowledge, then these can be construed as knowledge processes. The DR 2015 (3-11 and 10-6) also links action to intelligence, labelling it - "… actionable intelligence". Thus, intelligence is not just generated for the sake of generating intelligence or 'knowing'. It is generated with the intent to act, which implies that it should enable decision-making first and has a requirement for a specific after-action effect. Thus, to create defence effects and advantage through decisions and actions there is a requirement for actionable intelligence. Information and data are primarily building blocks to actionable intelligence. This is not explicitly recognised in the DR 2015, only alluded to.

Also from the quote above (DR 2015: 3-11 and 9-10), intelligence stems from human capacities and sensors. Typical types of intelligence that sensors can provide that will enable decisions and actions and monitor effects achieved in photos, videos, radar and sonar images and sound recordings.

The DR 2015 (3-11) also states that - "South Africa's prevention capability is primarily vested in the political, legal, diplomatic and intelligence dimensions of State authority.". Intelligence as capstone military knowledge is thus perceived as a critical national capability delivering strategically important knowledge artefacts (or intelligence). The SA DOD is responsible for a large part of this intelligence as stated earlier in the chapter. To deliver and manage this military intelligence and counter-intelligence requires KM systems and processes enabled by IM, IT and other IC.

The DR 2015 (7-8) requires the SA DOD, as part of Task 9 (Contribute to Peace and Stability), to have superior intelligence (amongst other things). Superiority alludes to intelligence that will result in an advantage. Simply stated, the SA DOD wants knowledge that will result in advantage from an offensive and defensive perspective. The DR 2015 (9-10 and 3-11) proposes that situational awareness will enable joint C2 and action –

> "… ensure joint action with respect to land, air, sea, information and space, and which must be capable of integrating with multi-national, inter-departmental and inter-agency components to achieve synergy. Joint [C2] must be enabled through a comprehensive situational awareness capability that provides integrated information acquired through liaison with allied and friendly forces and governments, local human intelligence, and static and mobile sensors for enhanced military decision making. This must be pursued at the strategic, operational and tactical levels".

Similarly, the DR 2015 (10-5) identifies information, situational awareness and intelligence as key components of a C2 capability. Mention is also made that situational awareness provides information for decision support and decision-making. Integrated information is identified as a requirement for intelligence and situational awareness. This information (derived from sensors), probably after processing, becomes intelligence further enabling situational awareness.

Surely, C2 and decision-making should be enabled through a comprehensive intelligence capability that provides situational awareness as opposed to 'integrated information'. Does the SA DOD perceive integrated information as intelligence? The proposed situational awareness must provide integrated information which amongst other things can be obtained from human intelligence, thus recognising the difference between information and intelligence. However, the notion of integrated information (also mentioned in the DR 2015: 3-11) is not clear. Integrated information or information integration requires a process of interpretation and understanding and skill and will probably lead to an intelligence-type artefact. Thus, the sentence should probably read - '… situational awareness capability that provides superior intelligence, acquired through liaison with allied and friendly forces and governments, local human intelligence and static and mobile sensors and other sources of information for enhanced military decision-making'. Arguments could also be offered that intelligence capabilities (rather than situational awareness capabilities) provide situational awareness and that situational awareness is an effect rather than a capability. The constructs of situational awareness, intelligence and information are symbiotic and aims at positive OODA loop effects.

The DR 2015 (9-13) states that intelligence uses IM systems to manage intelligence with. This confirms the notion that SA DOD knowledge in the form of military intelligence is enabled with IM systems. This is consistent with literature that IM systems and the employment thereof is not KM but just enablers to KM. Because the SA DOD seems to be entrenched in the information era the organisation could easily fall into the trap of believing it is accomplishing KM with IM efforts. Chapter 6 of the dissertation will shed more light on this predicament.

The DR 2015 (9-10) also links intelligence to Information Warfare (IW). Information warfare is a distinct capability, well established and universally used. There are new views on this, i.e. to move beyond or augment IW to Knowledge Warfare (KW), thus creating a capability that utilises knowledge artefacts and capabilities to conduct warfare with. "Knowledge is seen at the cent economic transformation (Bell, 1978), competitive advantage of an organization (Mayo & Lank, 1994) and a shift from "info-war" to "k-warfare" (knowledge warfare) (Baumard, 1996)" (Kakabadse, Kakabadse & Kouzmin, 2003: 76)

IW might be effective to create a certain level of military effect; however, in the current knowledge era and quick changing complex military operational environments should produce more desired effects. Why? Because warfare based on information ignores the dividends that might

be earned by exposing that information to intellectual processes, skill sets and experience that could extract the relevant meaning from the information (typically by means of SECI-like processes) thus enabling better understanding, facilitating more relevant decision, actions and effects based on knowledge (taking the form of intelligence and doctrine as examples). This understanding is reflected in the proposed definition of the dissertation for SA DOD knowledge and KM and is fundamental to a future SA DOD KMC.

If this is the intention of IW from the outset, then it should be called KW instead because knowledge and information are two different constructs as described in the literature review. The researcher believes the solution is somewhere in the middle because both information and knowledge are used in conjunction with IM systems as enablers as well as other technology (such as sensors) to conduct a type of warfare that is aimed at changing the behaviour of the opponent and/or negatively affect the OODA loop of the opponent. Because knowledge has been identified by literature to pay the highest dividends when it comes to competitiveness and advantage, the researcher believes this type of warfare should be labelled KW in order to redirect the focus away from the quest for information superiority to a quest for knowledge superiority. This would include all aspects of a knowledge continuum (e.g. data, information, intelligence, doctrine, IP and wisdom) to provide superior knowledge to the decision maker; guaranteeing superior OODA loop effects as well as a higher probability of disruption of the opposing forces' OODA loop. The DR 2015 (10-4) supports the conceptions of the researcher, calling for integration between different operating and information systems within the SA DOD. The call for integration is a common theme throughout the DR 2015 and is supported by the researcher of this dissertation. The requirement for understanding is highlighted here, which is a distinct effect of KM. It underlines the requirement for more than just access to all possible information – it suggests there is a requirement for quality knowledge artefacts to support decision-making and actions.

The DR 2015 (10-4, 3-11 and 10-9) names three intelligence functions - collection, processing and dissemination. These functions are semantically closely related to KM processes. These functions must be provided by all the Combat Services, making them primary role-players in KM. Distinct defence intelligence artefacts are stated, which should be regarded as capstone military knowledge artefacts specifically directed towards military operations and to achieve specific effects when considered. There is again a call for integration by means of - "… tailor made [*sic*] protocols", identifying another type of SA DOD IP, referring either to some sort of software or alternatively doctrine or both. The DR 2015 (10-9) identifies several types of intelligence that should be generated, distributed and managed, e.g. intelligence about opposing forces, terrain and population.

The DR 2015 (15-10) states that the Chief Defence Scientist has a distinct responsibility to develop technology that will enable intelligence gathering. There is thus a need for technology to enable intelligence collection. This technology will probably take the form of sensors that collect various forms of media that will be subjected to an intelligence cycle to produce military intelligence.

The DR 2015 (10-6) confirms the required presence of the SA DOD in rapidly changing complex operational environments. Complexity demands intelligence to be competitive, not information. An overload of information typically increases the complexity that decision-makers

have to deal with. Defence Intelligence, as a distinct functional component of the SA DOD, is mandated to provide this intelligence in collaboration with other elements of the SA DOD. Yet, intelligence is not mentioned as a core functional attribute in the acronym POSTEDFILT(B), alluded to earlier in this chapter of the dissertation. Defence Intelligence is thus a primary role-player in SA DOD KM. Other role-players named that rely on military intelligence are Combat Services (DR 2015: 10-4), defence planners and policymakers (DR 2015: 10-6); all considered key role-players in SA DOD KM.

Another requirement identified by the DR 2015 (10-9) is for information and intelligence to be translated into evidence for use in litigation. This points to another type of knowledge artefact required by the SA DOD as a result of, for example, border safeguarding operations.

5.3.6.4 SA DOD Doctrine

The DR 2015 (xxxvii) defines doctrine as - "Fundamental principles by which the military forces guide their actions in support of objectives. It is authoritative but requires judgement in application.". The SA DOD thus recognises the link between doctrine, as capstone military knowledge, and action and by implication decisions and their effect. Although not stated, doctrine is fundamental to advantage. In fact, advantage can be acquired with access to superior doctrine.

The DR 2015 (14-6) identifies doctrine as being a part of defence capability required to achieve a predetermined effect. Regarding doctrine as defence capability; doctrine thus equates capstone military knowledge as a defence capability. It also links military effects to the use of capstone military knowledge. This is reflected in the proposed definition for SA DOD knowledge and KM in this dissertation.

The DR 2015 (vi) states that doctrinal competence is a key part of the SA DOD deterrent capability and posture. Doctrine is, for this reason, part of POSTEDFILT(B), alluded to earlier in this chapter of the dissertation. Thus, the DR 2015 is aimed at (amongst several other things) articulating the defence responsibility to identify required doctrine (DR 2015: A-1). The SA DOD consider doctrine critical to executing its mandate (DR 2015: 2-8), as a key requirement to the provision of domestic security (DR 2015: 3-8). As such, the DR 2015 (0-2) provides key knowledge on strategic defence concepts, capability requirements and high-level doctrine; and require the SA DOD to have competencies (people and structures) that generate and manage doctrine (DR 2015: 11-3). DR 2015 (13-5) identify doctrine as a key component that informs the SA DOD design and structure – reiterating the importance that doctrine has as capstone SA DOD knowledge.

CSANDF is the primary generator and manager of SA DOD doctrine and also military strategy (DR 2015: 4-6) and should have a specific staff component for doctrine management (DR 2015: 11-12). Furthermore, a distinct doctrine execution capability is required (DR 2015: 4-2), which is essentially the SANDF. The various Arms of Service will develop and manage doctrine for their military capabilities (DR 2015: 10-15) specific to their functional responsibility.

The DR 2015 (13-2) identifies two levels of doctrine - defence doctrine and functional area doctrine. It is also stated that Defence doctrine will be the overarching doctrine, with the overarching combat service support doctrine following, culminating in specific combat service

support doctrines. The goal of overarching doctrine is integration. Each functional area has its own doctrine which must be aligned with overarching doctrine (DR 2015: 14-2). The DR 2015 (14-1, -2) identifies combat service support doctrine as a key knowledge domain – addressing knowledge areas such as health support, organisational structure, personnel-, logistics-, and financial resources. The SA DOD enterprise system has to be driven by both types of doctrine – thus the requirement for coherence and integration.

Noting the earlier findings on military knowledge and military KM such as tactics, techniques, procedures, training and legal knowledge the DR 2015 (3-8) also identifies with these. The DR 2015 thus confirms that the same hierarchy consisting of policy, strategy, doctrine, tactics, techniques, process and procedures are part of the SA DOD knowledge capability. This conclusion is confirmed by DR 2015 (9-32) which states the linkages between particular types of knowledge – strategy, doctrine, tactics, techniques and procedures. Integration is required because if there is a requirement for doctrine to evolve (as stated earlier) then the strategy, tactics, techniques and procedures will also have to be adapted. Furthermore, there is an integrated narrative and logic between the defence doctrine, force design, force structure, mandate, tasks and goals (DR 2015: 10-2). These issues are all linked to the prescribed SA DOD axiom 'we train as we fight'. 'Train' and 'fight' becomes the collective expressions for learning and action based on the knowledge contained in e.g. policy, strategy, doctrine, intelligence and occupation-specific subject matter as well as military sciences and a broad liberal education. This supports the conceptions of the researcher that an integrated KMC is a requirement for the SA DOD to establish coherence between these various components.

SA DOD doctrine, (strategy), tactics and training must evolve and adapt to cope with complex defence and security environments and the unpredictability of the future (DR 2015: 3-14, 5-1, 10-3 and 10-7). There is also a requirement for doctrine and tactics to evolve with defence requirements for (in this case) new technologies (DR 2015: 10-7); supporting earlier discussions on technology and IP.

In fact, the complex and changing SA DOD operating environment dictates that the required knowledge to operate sustainably and with advantage must continuously evolve with newly created meaning resulting from interaction with the environment in every dimension and for that knowledge to be relevant to any decision and action taken in both operational and corporate environments. The requirement for evolution, adaptability and flexibility supports the idea of a coherent and integrated KMC.

It is important to understand the requirement for adaptation and evolution in order to remain competitive and in control of the OODA loop. Thus, if doctrine needs to adapt and evolve then 'we train as we fight' will also require flexibility and adaptability to evolve under the pressures of environmental complexity due to change. This evolutionary premise is reflected in the proposed definition of the dissertation for SA DOD knowledge and KM.

Flexible doctrine and technology exploitation are identified (amongst other factors) as options to mitigate short-term vulnerability whilst the SA DOD is in the process of building its military capability (DR 2015: 10-8). Technology exploitation refers to knowledge portfolios managed by Chief Defence Matériel (Defence Technology Development), ARMSCOR, Defence Technology

Intelligence and Defence Industry. To generate the best knowledge artefact requires an integrated KMC that allows superior knowledge flow within the SA DOD security regime.

The DR 2015 (7-4 and 7-5) identifies doctrinal knowledge (but also tactics, techniques and procedures) to cross the national boundaries of the Southern African Development Community (SADC); thus creating the requirement for general applicability within extended geographic contexts to facilitate interoperability (DR 2015: 10-3). Important knowledge domains covering maritime security, nuclear defence, biological defence and military health protection are considered to be developed and managed. This will place a large KM burden on the SA DOD in order to keep track of the evolution of doctrinal knowledge as applied across the SADC and to ensure sustained interoperability. Some other types of military knowledge that will also be supported in a regional context are knowledge about logistics, training, education, intelligence, doctrine and procedures (DR 2015: 7-5).

Another type of doctrine mentioned is multinational doctrine, as was discussed in the section above regarding the SADC countries. This narrative clearly points to the requirement for integration of doctrinal knowledge, especially if doctrine at the various levels must also form a coherent whole with SA DOD policy and strategy and find expression in tactics, techniques, procedures and processes.

International Humanitarian Law obligations are identified as an important consideration to ensure SA DOD doctrine does not contradict international treaty obligations (DR 2015: 8-5). This requirement places an extensive KM responsibility on the SA DOD Legal Division.

The DR 2015 (9-3) requires doctrine to be integrated into the SA DOD acquisition programme and Defence Science, Engineering and Technology programmes in order to drive down costs and to ensure doctrine-man-technology integration. The integrated nature of defence capabilities, the establishment of them and the knowledge they require pre-empt a coherent and integrated SA DOD KMC.

The DR 2015 (12-2) identifies mission command as specific military doctrine. Mission command is a specific type of command, control and leadership philosophy; previously stated as ‘the art of command and the science of control’. Mission command will be more effective if the commander has access to relevant knowledge stemming from an integrated KMC. Thus the proposed SA DOD KM leadership philosophy of the art of knowing and the science of managing that knowledge must obtain and sustain advantage.

The DR 2015 (14-15) states the following about logistics doctrine - “Logistics doctrine will [sic] informed by the defence mission, goals and tasks. Logistics doctrine will be based on defence doctrine and will deliver a single, rigorous, comprehensive logistics process, founded on best practice military logistics principles and philosophy.”. Logistics doctrine and knowledge is mentioned as separate constructs in the DR 2015 (14-16). This knowledge could refer to logistics policy and strategy; whereas logistics doctrine probably includes elements of tactics, techniques, procedures and processes. These elements address the fundamental SA DOD logistics knowledge in both the ‘L’ and ‘D’ in POSTEDFILT(B). Because military operations are critically dependent on logistics, there should be a focus on POSTEDFILT(B) knowledge integration.

Chief Logistics is responsible for logistics, asset management and procurement related knowledge (policy, strategy, doctrine, training and procedures) (DR 2015: 14-16 and 17). Chief Logistics is thus a primary role-player in SA DOD knowledge. This knowledge significantly impacts the SA DOD's ability to conduct operations as required by its mandate and as prescribed by the DR 2015 due to the fact that military operations is dependent on defence matériel to produce required effects through the applying operational functions (i.e. firepower, C2, intelligence, security, logistics/sustainment, etc.).

Other specific types of doctrine identified by the DR 2015 all relate to POSTEDFILT(B); doctrine about personnel, common defence Information and Communication System (ICS), finance, combat service support doctrine (DR 2015: 14-6, -7, -9, -14, -16, -17, -19, -22, -20 and -24) and service-level and joint unmanned systems (DR 2015: 15-22).

There can be no doubt that SA DOD doctrine is capstone knowledge that requires decisions, actions, effects and advantage and that this knowledge needs to evolve in order to keep 'we train as we fight' relevant in complex military environments. An SA DOD KMC will greatly enhance the success rate of this objective.

5.3.7 Knowledge Management

The DR 2015 makes no specific mention of KM. It is only implied in certain parts of the narrative – as discussed above. The DR 2015 does not pronounce on an SA DOD KM champion and does not provide policy guidance as to the organisational structure or design, policy, strategy or core KM processes to be followed. Two knowledge generation processes identified in this paragraph are experimentation and exercises (10-3). The DR 2015 identifies some key KM process to be present in contracting documents as knowledge development and knowledge transfer (DR 2015: 15-8) and others are stated as part of intelligence above.

No SA DOD KMC is envisaged. This is contrary to the current academic and business practices and KM initiatives. The USA military (amongst others), as thé military superpower engages in KM.

In order to gain more insight into the assumption that the SA DOD is not interested in KM, the researcher delved deeper into the components of the SA DOD knowledge continuum. This is also based on the fact that the SA DOD seems to be entrenched in the information era; hinting that insight might come forth from asking questions about SA DOD IM and data management.

5.3.8 Information, Information Technology/Systems and Information Management

Currently, nations such as the USA recognises knowledge and KM as the primary source of strategic advantage or power and not information. In the knowledge era, knowledge is the power base with information just providing the building blocks. The knowledge era is not acknowledged in the DR 2015. The DR 2015 does not link knowledge to South African vital interests, but rather information.

The DR 2015 is describing information as a form of state-power (i.e. political, diplomatic, information, economic and military power) (DR 2015: 3-4, 3-5 and 4-6) and not knowledge. The DR 2015 (2-18) also states that – "… national economies are increasingly information-based, the

use of [IW] is becoming a serious threat facing governments". This is possibly the reason why the SA DOD regards information as strategic (DR 2015: 6-7) and does not engage in KM yet. This is illustrated by Task 7 (Ensure Information Security), labelling information an SA DOD strategic defence resource, hence the requirement for information security and autonomy (DR 2015: 6-7 and 14-22 and 23). DR 2015 (14-22) states the following -

> "Defence information is a strategic resource over which the Defence Force must exert complete control, ensure inviolable security and maintain absolute autonomy, ... The concept of 'information as a strategic resource' will drive all thinking on defence [IM], hence the use of the term 'information resource management'.".

This possibly influenced the DR 2015 writers and those that made submissions whilst not being aware that the world has entered the knowledge era during the early to mid-2000s and that increasingly, world-class organisations were using knowledge and KM as a basis for decision-making, action, effect and advantage.

The DR 2015 is very vocal on the construct information, the management thereof and its function as a warfare capability. DR 2015 (9-32) identifies IM as a key organic capability to the lowest functional level within the SA DOD. Note should be taken that the DR 2015 does not express on organic KMC. DR 2015 (14-5) states the requirement for enterprise-wide IT enablement. This is in stark contrast with the USA military that is institutionalising integrated KM to the lowest level of their military organisation.

Information is identified as a functional attribute of the SA DOD in the acronym POSTEDFILT(B) (DR 2015: xxxiii). Notably, neither intelligence nor knowledge or IP is mentioned and regarded as core functional attributes as discussed earlier. Although, both intelligence and information systems are identified as key defence resources in DR 2015 (14-4). This expands the statement above to regard both information and information systems as strategic. This recognition of information to be a strategic resource possibly places the SA DOD at risk of not managing the correct resource in the quest for enhanced decision-making, action, effects and advantage. If the emphasis is on information, IM and information systems - then there is possibly no organisational drive to extract new and relevant meaning and understanding (or knowledge) from it to positively affect OODA loop cycles and with increased accuracy in effects and sustained advantage. The SA DOD thus entrenches itself in the information era and associated paradigms versus moving into the knowledge era with the rest of the world.

The DR 2015 (4-8 and 14) identifies information as a key enabler to Parliamentary oversight of the SA DOD and also highlights the requirement for information security. Again, SA DOD knowledge should be the enabler for Parliamentary oversight, not simply information. If Parliamentarians are bombarded with SA DOD information they are also left to their own devices in terms of understanding and interpretation, which could lead to erroneous conclusions and/or assumptions that result in unnecessary parliamentary questions and wastage of time and resources in an attempt to answer these questions. The researcher is of the opinion that exposure to SA DOD knowledge artefacts will eliminate many of these issues and possibly result in better understanding and more optimised oversight. The SA DOD should never endeavour to enable parliamentary oversight with just information, but always with knowledge artefacts from coherent and integrated KM.

South African IT; amongst others such as safety- and security technology and aerospace technology; is posited as having the potential to maintain South Africa's position at the forefront of science and technology on the African continent (DR 2015: 1-4). Information technology, as a key enabler to progress and development, is thus recognised as such by the SA DOD in the DR 2015. Furthermore, the DR 2015 (10-20) identifies the SANDF as a key role-player in national information systems and defence and security infrastructure, emphasising the requirement for a comprehensive IW capability integrated with the intelligence systems and services. DR 2015 (14-6) identifies the Chief of Staff to be an important role-player in IM for the office of CSANDF. DR 2015 (14-22) identifies three types of information systems - C2 systems, administrative systems and service unique systems. Throughout the document, there is much emphasis on the integration of systems. This is also a key requirement and fundamental for successful KM and KMC.

The DR 2015 (3-12) identifies information as a combat capability (albeit non-kinetic). SA DOD knowledge does not share a similar affiliation. This is endemic to entrenched information era thinking. The DR 2015 (4-2) states that information is a critical capability for C SANDF in the form of a combat formation. The DR 2015 (10-9 to 10, -13, 11) identifies information as SA Army, SA Navy and SA Air Force combat capabilities. This fits well with the thinking that information is strategic to the SA DOD. Several other combat formations are mentioned but it does not identify a defence intelligence capability under command and as a combat formation. Yet, a part of the IW capability is inherent in the DI mandate (i.e. psychological operations and some counter-intelligence functions).

These envisaged combat capabilities will also have an intelligence capability. Thus separating the constructs of information and intelligence and conforming it to evidence from the literature review of the dissertation. The DR 2015 identifies real-time information and intelligence as requirements for air operations. This requirement is based on the speed with which air operations naturally take place and corresponds to the notion of time-value of the knowledge continuum.

The SA Army's signals function is tasked with information distribution and technical support. The SA Army engineer's functions are to acquire, produce and manage geographic information. This introduces several knowledge processes; i.e. distributions, technical support (IT management), acquire and produce. There is thus a distinct overlap from a process perspective between IM and KM; which might feed the perception that IM constitutes KM. It is becoming increasingly evident that military knowledge and the management thereof are not just enabled by IT but also by sensors. Sensors might be described as the primary source of knowledge continuum artefacts over and above human intelligence and other sources of intelligence collection. Sensors are thus fundamental to a future SA DOD KMC.

The DR 2015 (xi, xxxix, 2-18, 10-20, 14-23) identifies the requirements for an SA DOD IW capability, which is assumed to be a non-kinetic measure; also, intelligence-related information systems; but also identifies information as a key support capability to military combat formations (DR 2015: xi). DR 2015 (10-6) highlights IW as a key threat to be monitored by DI. The DR 2015 (10-19) identifies IW (informational and psychological dimensions) as part of the SA DOD Special Forces competencies. Air operations should also participate in IW (DR 2015: 10-11)

The DR 2015 (10-4) also classifies information operations (InfoOps) as a form of non-kinetic firepower, calling for integration with other operational systems. The DR 2015 (10-20) explains the

modalities of IW – which involves the defensive and offensive use of data, information, frequencies, information infrastructure and people. The use of people-centred IW or psychological warfare aims at a psychological effect to be achieved. DR 2015 (10-21) specifies that IW equipment should be locally manufactured based on the fact that IW is considered a strategic capability. This aims to maintain control over the security of supply and security of the manufacturing process. KW is not mentioned by the DR 2015 as possibly the next generation capability required, as recognised by the USA and posited by some academics. Knowledge Warfare might have similar requirements regarding the security of supply of technology because KW will invariably be enabled by similar IT as is the case with IW. Information-Based Warfare (IBW) is linked to situational awareness. Situational awareness is a component or key effect of IntOps. The DR 2015 (10-20) establishes a link between command, control and administrative information systems. Command and Control Warfare (C2W) is closely linked to efforts to disruption of the OODA loop – as discussed in the literature review. These types of warfare are all symbiotic in the sense that they are based on and distinctly use knowledge continuum artefacts, humans, IT and sensors in a non-kinetic manner to achieve the desired effects and possible advantage. Knowledge Warfare will be a more suitable umbrella term that encapsulates the use of the entire knowledge continuum as a warfare capability. The current configuration contributes to the dissonance between constructs, e.g. is information intelligence or is intelligence information, as an example.

To belabour the point of construct dissonance; the DR 2015 (3:11) states the requirement for the re-establishment of an effective SA DOD intelligence capability to provide integrated information by means of various resources at all levels of organisation and operations. The statement creates the impression that an intelligence capability must provide information. This is obviously grossly inaccurate. Intelligence capabilities process knowledge continuum artefacts as well as other elements of IC to produce capstone military knowledge, i.e. military intelligence and counter-intelligence. This type of statement in SA DOD Level 0 policy thus creates and perpetuates construct dissonance. It highlights the requirement for coherence and an authoritative taxonomy of concepts and constructs.

The DR 2015 (xii and 0-8) proposes an enterprise information system (based on a single overarching IT infrastructure) linked to National Treasury's Integrated Resource Management System as a requirement for SA DOD command, control and administration. These capabilities and systems are positioned to be networked with national and international networks. The DR 2015 alludes to the requirement for the comprehensive integration of sub-systems to take place as the foundation for all defence business processes and activities. Thus, the DR 2015 (based on this paragraph) proposes an IM approach as the basis for defence business processes, decision-making and action; rather than a KM approach. This is contrary to what is proposed by literature.

The criticality of information security and the perceived threat to information integrity and information systems due to cyber-security related threats are highlighted (DR 2015: 2-18), resulting in information security being labelled as a vital interest (DR 2015: 3-7). Very importantly, it is stated that - "… national economies are increasingly information-based, the use of [IW] is becoming a serious threat facing governments" (DR 2015: 2-18). The DR 2015 (2-27) links national security imperatives to information infrastructure security and by implication also to information security.

The DR 2015 (3-14) identifies information acquisition and analysis capabilities (thus also alluding to two types of knowledge processes) as critical enablers to respond to change and provide situational and domain awareness. Because of the interchanged use of information and intelligence – it is not clear whether this should be information acquisition and analysis or intelligence acquisition and analysis or both. The DR 2015 does make constant reference to situational awareness (DR 2015: vii, 3-14, 5-4, 5-5, 6-2, 9-10, 10-2, 10-5, 10-11, 10-14, 10-21) as an SA DOD operational function; but also to domain awareness (DR 2015: viii, xiii, xxxviii, 3-14, 9-4, 9-5, 9-11, 9-13, 9-21, 9-22, 10-11, 10-13, 10-16). The domain awareness definition in the DR 2015 (xxxviii) is - "The effective understanding of anything associated with the maritime domain that could impact the security, safety, economy, or environment South Africa or its forces.". This refers to knowledge of the domain (whether it is a geographical, cyber, organisational, or another type) due to the use of the construct of understanding being brought into the capability fold (as per the proposed definition of knowledge). The literature review identifies understanding as a key component of generating knowledge or managing knowledge. It is this 'understanding' that will lead to new meaning or knowledge when required for decisions, action, effects and advantage. The DR 2015 (3-14) states it as follows - "Heightened levels of domain awareness and appropriate decision-making and leadership will therefore be the critical factor in determining the appropriate preparation for and responses to emerging security trends.". The more traditional operational function is called intelligence rather than situational- or domain awareness, which constitutes military effects. Both of these are not possible without intelligence. Information will only render a lower quality effect and thus negatively affect the OODA loop.

The DR 2015 (4-3) identifies the continental staff system functions (briefly discussed in the dissertation literature review). Both intelligence and IM capabilities are part thereof. It is possible to have a KM function within the specialist staff component of the continental staff system. However, the DR 2015 does not elaborate on these issues to that level of detail. The intelligence component only deals with specific types of military knowledge and is thus not representative of a coherent and integrated SA DOD KMC.

Continuing the discussion on the continental staff system; the proposed intelligence capability represents a sub-system with which to provide situational and domain awareness, risk analysis, knowledge about military and other threats and other knowledge for operational use. The information and communication systems component of the continental staff system focus on information technology and not the information (content) itself per se, thus supporting the idea of being a KM enabler for the SA DOD. The IT invariably used, manages the content of several SA DOD information systems and provide enabling capabilities to KM processes such as analysis, search, sort, collation, archiving, share, use, etc. The continental staff system still only addresses the information era management environment, except if a case could be made that intelligence addresses all the components of capstone and other military knowledge required to enhance decision-making, action, effects and advantage (which there is very little evidence of, if any). Intelligence, in the continental staff system, addresses all self and opposing forces' knowledge that would support operations. The knowledge that does not necessarily support operations will not be visible, e.g. research and development knowledge such as defence matériel related IP.

If knowledge is considered strategic and critical to advantage then it should have a prominent position in the continental staff system – and not just hidden away in the specialist staff component

or as a part of the other components (e.g. intelligence) of the system. It could possibly be co-located with intelligence and named actionable knowledge. This should integrate all relevant knowledge (e.g. own- and adversary intelligence consisting of comprehensive knowledge about doctrine, policy strategy, tactics, techniques, procedures, processes and IP at strategic, operational and tactical level) in a coherent and integrated manner. When intelligence and KM are separated; decisions, actions, effects and advantage might be compromised due to a loss of coherence and integration. However, if intelligence is understood to encompass all relevant knowledge as stated above, then intelligence management could be perceived as KM. This, however, is not the case at all levels of the organisation (e.g. at corporate level vs. operations). These predicaments make an authoritative taxonomy on these concepts and constructs paramount to the SA DODs' functioning by eliminating possible construct dissonance and management ambiguities. Introducing a KM staff component in the continental staff system will render much debate and will require much research on C2 related issues – which is outside the scope of this dissertation – but nonetheless should be extraordinary research to complete.

The DR 2015 (5-2) identifies information as a measure (linked to a capability) to prevent conflict in Task 1 (Deter and Prevent Conflict). Information at a national strategic level (amongst the others mentioned - political, diplomatic, informational, societal and military measures) are thus positioned to have pre-emptive or deterrence value. This is typically stated from an IW perspective that would include elements of intelligence. Pre-empting and deterring would be better achieved through intelligence than information. The latter part of Task 1 lists other sources of important military knowledge such as curricula involved with training, technology and doctrine are stated.

The first part of Task 3 (Defend South Africa) alludes to OODA loop effects (DR 2015: 5-4), or first mover advantage based on first knowledge and action - "South Africa would seek to either take the initiative to prevent an attack or embark on deliberate self-defence when an aggressor is able to exercise the initiative.". The second part of the paragraph identifies InfoOps and intelligence as key enablers to the concept of initiative - "… fluid, high-mobility and high-tempo manoeuvre, predominantly offensive operations at the tactical level, maximum use of superior [C2], intelligence, reconnaissance and surveillance systems and [InfoOps], and flexible, responsive sustainment support.". This supports already stated views that the SA DOD conceptualise information and intelligence differently, notwithstanding the fact that functions of intelligence are also inherent in InfoOps. What is also important is that the concept of operations is primarily based in enhanced decision-making (C2); action (manoeuvre and offensive operations) and effect (mobile, high tempo, fluid, superior C2, flexible, responsive sustainment) in order to gain and/or sustain advantage. This supports the conceptualisation that a future SA DOD KMC should principally exist to enhance or optimise decision-making, action, effects and advantage through the art of knowing and the science of managing that knowledge to obtain and sustain advantage in the national interest. This is captured by the dissertation- SA DOD KM philosophy and proposed definitions of knowledge and KM. Just relying on information and IM will diminish the SA DOD first mover advantage or render the SA DOD initiative at risk.

Task 5 (Safeguard Critical Infrastructure) mentions the criticality of information about National Key Points (DR 2015: 6-5). Task 5 expresses on the requirement for protection and security of National Key Point information and IP. This is recognition of the differentiation

between elements of the SA DOD knowledge continuum. Both information and IP is stated as being a strategic resource supporting the opinion that IP is capstone military knowledge.

Supporting Task 5; Task 7 (Ensure Information Security) addresses information security (DR 2015: 6-6 to 8). Task 7 identifies and discusses secure information and communication as a specific effect to be achieved. There is also discussion about information security and freedom of expression nexus (DR 2015: 6-7). Task 7 (DR 2015: 6-9) reinforces the security requirement for SA DOD and other state information. It is positioned as a specific SA DOD task. Communication is the key to KM (knowledge sharing and generation in order to execute SECI processes as described in the dissertation literature review). Thus, communication security will have an impact on information and knowledge flow and thus on KM.

Information security is also linked to South African national security and economic imperatives. In fact, this is a legislated requirement and expressed in several other places in the DR 2015. The SA DOD share some responsibility for information security with the State Security Agency [Electronic Communications Security (Pty) Limited], the Police Service, Department of Communication and Department of Science and Technology (DR 2015: 6-7 and 8). These are all stakeholders that should be considered when constructing an SA DOD KMC. However, nothing is said about knowledge security; probably because the writers of the DR 2015 perceive information inclusive of knowledge. This is contradicted by the fact that there are several references to information, knowledge, intelligence, IP and doctrine as separate constructs. This conundrum complicates coherent and integrated KM within the SA DOD. It will certainly complicate the security of SA DOD knowledge. The SA DOD needs to recognise knowledge security as the primary goal. This should encapsulate all aspects of the knowledge continuum.

Cyberspace is identified as a key enabler to information flow and also a key risk to information security. It is almost overstated. No mention is made specifically about document security in formats other than electronic format. (DR 2015: 6-7). Information and data are also used interchangeably, again alluding to construct dissonance.

Over and above information security being a priority, the SA DOD aims at information superiority (DR 2015: 6-7). This might lead to information overload if not properly managed. Literature refers to knowledge superiority as being the current strategic objective or desired effect with which to achieve an advantage.

InfoOps and IW (DR 2015: 6-7) are suggested as a possible means to secure and exploit SA DOD and other information. The DR 2015 (9-14) identifies the following components of IW as network warfare (NW), Electronic Warfare (EW), Psychological Warfare (PW), InfoBW, information infrastructure warfare (IIW) and C2W. These can be construed as particular types of KW activities and should be fundamentally enabled by a future SA DOD KMC. Although these are internationally recognised and practised forms of warfare, many of these are aimed at information systems (hardware and software). PW is in the human domain and will require an acute understanding of the human psyche which will be more closely associated with knowledge than with information. Attacking and/or securing information systems will affect the integrity and availability of the information. If the integrity of the information-base becomes unstable it will negatively affect the generation of knowledge. Thus, IW by its very nature aims at leveraging

information, thus reducing the human psyche to information. KW, though, aims at leveraging the entire knowledge continuum, encapsulating all aspects of technology, sensors and humans.

The researcher is of the opinion that there is possibly a requirement for both types of warfare (i.e. IW and KW) because of the different decisions and actions required and the differences in effects that can be obtained. It could also be argued that by attacking the building blocks of knowledge is a pre-emptive strike on knowing.

Task 7 (DR 2015: 6-9) also proposes Joint IW (indicating that the effort is organisation wide and that there is a requirement for integration) as a possible means to secure the information but also exploits the information to the advantage of the SA DOD. Again, suggestions of information superiority as an effect are suggested by means of IW to dominate the information sphere (DR 2015: 6-9). What is problematic is the fact that the "human domain" is linked to information superiority. The "human domain" typically refers to human intelligence – which is not IM but intelligence management that employs knowledge processes that others associate with IT and other sensors.

In Task 7 (DR 2015: 6-9) several proposed effects are to be achieved with IW in order to achieve information superiority. These are deterrence, protection, disruption, destruction, denial, exploitation, superiority and influencing the beliefs and behaviour of humans in the physical, information and cognitive (psychological) domains. Beliefs, behaviour and cognitive processes are applied to information in order to generate knowledge (or intelligence in the military context). In order to achieve this, there should be intelligence and IW doctrine in place. Again, the prescripts are useful for organisations that function in the information era but need new thinking for the knowledge era. The difference between the effects that could be achieved with IW and KW is quantitative (reducing information overload) and qualitative (KW should produce enhanced decisions, actions, effects and advantage).

The DR 2015 (9-13) identifies IW to be conducted in all operational domains parallel with conventional warfare. Integration should take place between IW capabilities and intelligence-related information systems and other related systems. An interesting concept is intelligence-related information systems. Intelligence (as capstone military knowledge) is enabled or managed with IM systems, possibly creating the impression that intelligence is information and creating construct dissonance, possibly reinforcing the perception that the SA DOD needs only to manage information and not knowledge.

Task 7 (DR 2015: 6-9) proposes encryption of data as a means of security. This has vast implications for KM from an access and sharing perspective. However, without the protection of key knowledge and its building blocks, the advantage might be lost. This dilemma raises the question of how much protection is required to secure advantage without paralysing knowledge growth.

The DR 2015 (7-5) identifies types of information being managed by the SA DOD but also the importance of information exchanged with Regional and Continental Partnerships as part of the SA DOD Defence Diplomacy strategy. The types of information that are mentioned are - threat perceptions, defence budgets, force structure, modernisation plans, general defence cooperation, high-level visits and troop deployments. These are typical essential elements of information for

intelligence collection requirements of any military. These can be subdivided into information categories as stated by DR 2015 (14-22): sensor-, military-, corporate- and common information. The DR 2015 (13-3) identifies performance management information as a specific type of information managed by the SA DOD; being typically required within the SA DOD corporate environment. The DR 2015 (14-22) refers to the possible effects that the IM and the associated systems must achieve as being autonomy, accuracy, quality, non-duplicated, relevancy and timeliness. These effects are also to be achieved by KM; again reiterating the overlap between IM and KM.

Task 9 (Contribute to Peace and Stability) proposes network-enabled information sharing. This corresponds with concepts in RMA. In Task 9 information and intelligence superiority are addressed again as separate constructs as well as desired effects. Thus, there is a requirement for particular military knowledge superiority, i.e. intelligence. In the statement -"Superior [C2], protection, firepower (including non-lethal and precision capabilities), mobility and manoeuvre, information and intelligence, and sustainment are critical" (DR 2015: 7-8), situational and domain awareness are replaced correctly with intelligence because situational and domain awareness are effects of intelligence.

The DR 2015 (9-10) identifies a situational awareness capability that should provide integrated information from a variety of sources (amongst others human intelligence) as discussed earlier. The researcher wonders what the SA DOD intelligence capability is for?

The DR 2015 (10-5) identifies information, situational awareness and intelligence as key components of a C2 capability. Mention is also made that situational awareness provides information for decision support and decision-making. Integrated information is identified as a requirement for intelligence and situational awareness. This information (derived from sensors), probably after processing, becomes intelligence with situational awareness as an effect. These discussions above about information, intelligence, integrated information, situational awareness and domain awareness should all be defined in detail and in a coherent manner in an authoritative SA DOD taxonomy on concepts and constructs. Such taxonomy should be managed by a future SA DOD KMC.

The International Hydrographic Organisation is stated as a specific stakeholder of SA DOD knowledge due to the responsibilities of the SA Navy Hydrographer as a service provider. Maritime safety information is identified as a specific type of information being managed by the SA Navy Hydrographer (DR 2015: 8-2). Hydrographic (also referred to as nautical) data and information are managed by the SA DOD to enable the safe navigation as an effect (DR 2015: 8-2). This data and information must be of an international standard taking into account international resolutions and recommendation. Specific hydrographic knowledge artefacts are - nautical charts, sailing directions, lists of lights, tide tables and official nautical charts and publications. Most of these conform much closer to being knowledge than information does.

The DR 2015 (13-1) identifies a high priority requirement for a defence enterprise IM system due to outdated and disjointed legacy information systems, providing automated, real-time, end-to-end defence management, supporting both defence administration (blue network) and military C2 (red network). It is a risk for the SA DOD to base its decisions, action, effects and advantage on an

IM system that is fragmented and unintegrated. Especially if the SA DOD regards the resources managed with this system i.e. information, as a strategic resource.

Task 7 (DR 2015: 6-9) states defence information systems are required for C2, administration, personnel, logistics and finance. Note that fragmented management information systems inhibit integrated and systemic decision-making on stock levels, equipment and strategic fuel reserves, maintenance and repair (DR 2015: 9-6) – or simply; the ability of the SA DOD to conduct operations. The remedy to this is enterprise systems.

The DR 2015 (9-18, -21 and 10-20) identifies an integrated defence enterprise information system as the backbone information system to drive administration and defence C2. The DR 2015 (9-14) identifies administrative [IM] systems as a type of SA DOD IM system; and state their criticality as a transverse system and to combat support (DR 2015: 14-2). Some of the key effects to be delivered by the enterprise information systems are standardisation, compatibility, connectivity and interoperability (DR 2015: 13-1). A Defence enterprise IM system is required to be (rapidly) adaptable to cope with change (DR 2015: 13-3). Information technology is a key enabler in performance management, strategy execution and decision-making and thus needs to facilitate flexibility and adaptability. These are important aspects to consider for a KMC. Defence enterprise system characteristics include -

> "a. The enablement of combat service support through automated, tracked, in-transit visible, real-time information which is integrated with various resource system databases and networks. [DR 2015 (14-22) states that the information and communication systems is positioned as a combat service support system and must provide the following functions (processes): access to information, security, connectivity and autonomy.]
> b. The defence enterprise system must be:
> i. Driven by core Defence Force doctrine and functional area doctrine.
> ii. Granular, secure and accessible.
> iii. Compliant with defence regulatory framework standards.
> iv. Integrated across all resource areas.
> v. Deployable at all locations of defence activity.
> vi. Operational to the lowest functional level in the field, performing over limited bandwidth and non-persistent network infrastructure, or even independently at remote locations.
> vii. Complete business-to-business system integration with information at the 5th line of support, industry standard information systems and other defence [IM] systems.
> viii. Enabling of data integrity and clean-up of disparate information." (DR 2015: 13-2).

This positions IM and the defence enterprise system as the primary enabler to key areas of a KMC such as policy, doctrine, intelligence, IP, security, integration, accessibility (knowledge sharing to the lowest level) and reduction in data/information overload. Such a system will be a fundamental enabler to a proposed SA DOD KMC from the perspective of the integration of 'all resource areas.

Task 7 (DR 2015: 6-9) posits information systems as a C2 enabler, and by implication, an enabler to decision-making, action, effects and advantage. Weapon- and administration information systems are also named as two distinct enablers.

Other types of information systems named are health informatics, telehealth and health intelligence, hinting at specific health information being managed by the SA DOD (DR 2015: 6-7). When subjected to SECI type knowledge processes, these will result in specific health-related knowledge, e.g. health intelligence.

Another important information systems identified (DR 2015: 13-1) are Integrated Resource Management System of National Treasury and Integrated Financial Management System. The migration to the National Treasury's Integrated Resource Management System implies that Defence will utilise information systems common to RSA government departments. The Integrated Defence Enterprise System and General Defence Network (Blue Network) are positioned to provide the foundation for the SA DOD business processes and activities. These systems are thus positioned as primary KM enablers that should provide critical information from which new meaning can be extracted.

The DR 2015 (14-4, -5) identifies SA DOD resource systems (typically information systems supporting the management of personnel, intelligence, operations, logistics, planning, ICS, training, finance and specialist staffs) as a primary source of information. These resource systems reflect the components of the continental staff system discussed earlier. Budgets, expenditures and revenue are also key financial information components (DR 2015: 13-3). Integration with other SA DOD systems is a stated requirement as discussed earlier and is a recurring theme. These must also provide "information and advice" (DR 2015: 14-4) to SA DOD decision-makers. The advice in this instance is separated from information (content) because advice is knowledge (information in context). The statement provides evidence that SA DOD decisions are required to be based on more than just information, a statement that is contradicted elsewhere in the DR 2016.

Expanding on other information system requirements by the SA DOD; are a Personnel Information System (DR 2015: 14- 9 to 10), a Logistics Information System (DR 2015, 14-13 to 16), a Defence Procurement Information System (DR 2015: 14-17 to 20) and the Defence Finance Information Management System (DR 2015: 14-20). These are all stated as short-term implementation priority which must be integrated with the Defence Enterprise Information System and other relevant government information systems such as the National Treasury Integrated Resource Management System and Integrated Financial Management System as previously stated. The narrative refers to both Personnel Information System and personnel IT system, without clarifying differences (if any). Similar effects as stated earlier in this chapter are to be achieved by these information systems, i.e. enhanced effectiveness, efficiency, economy, transparency, integrity and simplicity. The Defence Finance Information Management System must be based on a single, rigorous, comprehensive and tailorable finance management process. Important information being managed is personnel-related information about administration, policy, doctrine, functional and competency standards, standardisation and training curricula. The Logistics Information System should enable military supply chain management and life-cycle management. This should typically be informed by the logistics policy, strategy and doctrine. Primary information being managed with this system relates to financial information, defence movable and immovable tangible asset procurement contained in the Defence Procurement Register, assets and contingent liabilities procurement reporting and procurement of assets used by foreign deployments. These are typical types of information within the corporate, military and administrative categories.

The DR 2015 (14-28) identifies the priority of a Geographic Information System in support of the maintenance of defence ranges (amongst other requirements). There is an SA DOD long-term procurement priority to implement Best Practice Military Procurement Management based on a single integrated Procurement Management Information System and the establishment of a Defence Procurement Regulatory Framework. There should also be integration between the Procurement Information System and a future accrual accounting requirement. (DR 2015: 14-19). There is mention of a requirement for specific SA DOD procurement curricula to train procurement personnel (DR 2015: 14-19). These issues all conform to KM processes and actions. The SA DOD should consider instituting best practice management for all its functional components. Best practice management should be centralised in a future SA DOD KMC to ensure integrated feedback to knowledge champions within the SA DOD. From the researcher's experience, there are some elements of best practice management in the SA DOD. However, best practice management is not institutionalised enterprise-wide and certainly not integrated.

Records management is a responsibility of the C SANDF ICS staff as per the National Archives act (DR 2015: 14-24). This can be construed as both IM and KM activities as some artefacts might only be of informational value, others might be knowledge.

An IW sector is a stated requirement within the Defence Industry (DR 2015: 15-5). Inevitably, this will require certain technology domains to be established in the Defence Industry, notably IW and IT (DR 2015: 15-6). Other related technology areas to be established or maintained are data fusion and intelligence gathering sensors, analysis and evaluation technology. These technology products are knowledge enablers due to the processing of knowledge continuum artefacts.

The responsibility for IT and IW development programmes is allocated to the future Chief Defence Scientist, thus identifying the Chief Defence Scientist as a fundamental role-player in SA DOD KM (DR 2015: 15-10). Chapter 15 of the DR 2015 further describes key knowledge domains to be developed and maintained by the SA DOD. These are, however, not labelled 'knowledge domains', but rather technology domains, raising questions as to the SA DOD definition of technology which is not defined in the glossary of terms, possibly resulting in less than optimal solutions and wastage. These domains are - C2, IW (at all levels of war), systems integration, secure communications, IT, including data fusion technology, intelligence-gathering sensors, analysis and evaluation technology, target acquisition and identification technology, unmanned systems (aerial, ground, surface and under-water), missile and wider guided munitions technology, night and poor visibility observation and engagement technology, EW technology, rugged tactical vehicles optimised for operations on the African continent, mine and improvised explosive devices detection and protection technology, artillery, precision bombardment and point target engagement systems, chemical, biological and radiological defence, including military carbons and canisters, battlefield medical care optimised for the African continent and modelling and simulation (DR 2015: 15-10).

The researcher assumes that these technologies are not just hardware but that each technology domain supports a significant portion of scientific data, information and knowledge (e.g. IP), which, if not managed with coherence and integration in mind will render less than optimal solutions. The key question remaining – does the SA DOD regard technology and knowledge as the same

construct? Clarity is required on the SA DOD definition for the construct of technology. The effect to be achieved by the Chief Defence Scientist is to assure that the SA DOD -"… remains an intelligent, educated buyer in specific fields of defence matériel" (DR 2015: 15-10). Both 'intelligent' and 'educated' as criteria are offspring of knowledge. SA DOD KM is thus a requirement.

5.3.9 Data

Data is regarded as the smallest building block within the knowledge continuum. The discussion above, thus far, provided ample evidence of the status of knowledge and KM within the SA DOD. However, the researcher finds it necessary to take the analysis full circle by considering the remaining element of the knowledge continuum, for clarity.

There are various types of data in the SA DOD and on the battlefield. This requires networked enabled C2 to make this available to enhance situational awareness. (DR 2015: 13-3) The data referred to will obviously have to be processed into some form of information and then knowledge before situational awareness can be achieved. This has been discussed above. Expenditure data (DR 2015: 2-20) and hydrographic data (DR 2015: 8-2) are identified as types of data being managed in the SA DOD; showing the diverse spectrum of data present. Important types of data for the construction of hydrographic knowledge (navigation safety publications and navigation warnings or notices to mariners, tide tables for South African and Namibian Harbours) are maritime warning data and national tide data. Other important hydrographic knowledge artefacts emanating from hydrographic data and information are official nautical charts, sailing directions, lists of lights, tide tables and other official nautical publications.

Data can be defence IP, based on the IP definition discussed earlier (DR 2015: xxxvii and 15-16). Included in this definition are various types of SA DOD information and knowledge. Data can be at risk to cybercrime and cyber-attack – thus the requirement for security (DR 2015: 2-18 and 6-7). This is the case for information, intelligence and IP as stated earlier. The DR 2015 (6-7) makes an important contribution to how the SA DOD uses data, information and intelligence produced by weapons systems and sensors. Consider the following -

> "Information and communication systems and technology are tools enabling [C2] to be exerted in warfare. They provide the infrastructure for weapon systems and sensors to exchange relevant data and allow decision-makers to use data, information and ultimately intelligence to visualise the battlefield [i.e. situational awareness] and make successful military decisions" (DR 2015: 6-7).

Firstly, the quote acknowledges the knowledge hierarchy described in the literature (data, information, knowledge (intelligence), posited by the researcher to be a knowledge continuum rather. This continuum is recognised as ending with intelligence or capstone military knowledge. Importantly, that decision-making leading to success is facilitated by intelligence (a product of data and information processes to create new meaning or knowledge). These issues have been discussed and confirmed in Chapters 2, 3 and 5, thus far. They are thus also reflected in the proposed definitions of knowledge and KM in this dissertation.

The DR 2015 (6-7) describes the sharing of data as being 'transported'. The literature describes this process as being 'shared' or data/information/knowledge 'flow'. The fact that data is

described as being transported almost commoditise it, enclosed in some form of container – which speaks to the predicament of security (through encryption) rather than the requirement for freely available and accessible data/information/knowledge to enable growth and innovation. The SA DOD should standardise the terminology used to ensure unambiguous understanding. The dissertation proposes some core processes in Chapter 8 of this dissertation to assist with this.

The DR 2015 (13-2, -3) alludes to some important data management processes as data clean-up, integrity determination, archiving and (DR 2015: 14-10) validation required and also identifies databases as the feeding source for combat service support information.

The DR 2015 (14-9, -15, -18, -19, -20) highlights data integrity as a deliverability to be achieved by the Personnel Information System, Logistics Information System, Procurement Information System and the Finance Information System – specifically for financial data in Cabinet Memoranda. This integrity is very important because it provides credibility for subsequent information and knowledge. The chain (or continuum) is as weak as its weakest link.

The DR 2015 (15-6, -10) identifies data fusion technology as part of IT – which is a technology development focus area for the SA DOD. The SA DOD thus has a requirement for technology that can produce information. This is a responsibility is assigned to the future Chief Defence Scientist.

5.4 CONCLUSION

This chapter provided a view on the projected future of SA DOD KM as articulated by the DR 2015 (SA DOD Level 0 policy) and based on the current reality stated in the national legislation. Knowledge management is not expressed as an SA DOD requirement in the analysed legislation nor the DR 2015. The analysed legislation and the DR 2015 leave the researcher doubtful of the SA DOD interest in KM. Priority is attached to various forms of military knowledge but no priority is expressed to manage knowledge as a strategic asset. However, there is extensive expression on several of the components of a KMC, with no distinctive structure or mechanism to bring these together in a coherent and integrated KMC.

The SA DOD is mandated to provide defence and deterrence as well as an affordable and departmental obligation to enhance decision-making, actions, effects and advantage in support of the national and international obligations. The SA DOD has an international obligation to manage its knowledge stemming from International Humanitarian Law obligations, involvement with Southern African Development Community doctrine, sharing of intelligence and leveraging IP internationally and hydrographic knowledge for a very large geographic area, etc. Coherent and integrated KM is proposed as a critical enabler to successfully address this mandate and obligations.

There are a number of factors in the DR 2015 that will make SA DOD KM implementation challenging. The DR 2015 has not progressed into the knowledge era and does not acknowledge knowledge as the strategic organisational resource. The DR 2015 categorically states that information is strategic to the SA DOD, thus entrenching the SA DOD in the information era and IM for the foreseeable future. The SA DOD still emphasises data and information warehousing for possible use (creating and exacerbating information overload); rather than focussing on creating

new meaning from the available data and information and crafting knowledge artefacts with enduring value that enhance decision-making, action, effects and advantage.

The DR 2015 identifies all the components of the knowledge continuum (data, information, knowledge and intelligence) as variables, with differing levels of importance attached to them, to be managed by the SA DOD. However, these constructs are not properly defined from the onset, possibly fuelling construct dissonance and the perception that the SA DOD is not interested in KM. This calls for a detailed, authoritative taxonomy to be constructed as the basis for policy and doctrine formulation.

The DR 2015 places enormous emphasis on the development, maintenance of knowledge artefacts such as policy, strategy, doctrine, intelligence, tactics, techniques procedures and processes. This knowledge is required for leadership (or C2), interoperability (jointness), operational flexibility to cope with the demands of uncertain and ever-changing defence and security environments. However, coherent and integrated management of such knowledge is absent. An SA DOD KMC could possibly provide such coherence and integration through excellence in leadership, taxonomy, best practice management and other KM techniques and processes.

Types of knowledge to be managed by the SA DOD as identified from the DR 2015 are discussed in detail above and provide a clear indication of the complexity involved, thus supporting the requirement for coherence and integration. This comes with the understanding that all the building blocks of the knowledge continuum need management by a coherent and integrated capability to be able to extract advantage from it. Yet, no such capability is prescribed by or described by the DR 2015. Various components of such a capability are mandated, described and prescribed. However, no mention is made of a structure solely responsible for SA DOD KM coherence and integration.

The DR 2015 identifies several primary role-players/stakeholders in SA DOD KM as the MOD, Sec Def, Chief Defence Matériel, Chief Defence Scientist, Chief Financial Officer, C DI, Chief Logistics, Chiefs of Arms of Service and Divisions, Squadron Commanders and the ARMSCOR Chief Executive Officer. The question is which one of these should be the SA DOD CKO or should the SA DOD CKO be an entirely new mandate and structure?

A critical success factor for SA DOD KM is a transformational leadership approach to the implementation of KM. Thus, the identification and appointment of an SA DOD CKO as the champion for SA DOD knowledge is paramount.

The fact that education is considered to be driven by knowledge processes; makes it imperative for the SA DOD to identify which are core knowledge processes. These should be articulated and promulgated in KM policy and defined in taxonomy.

Only IM and intelligence management are distinctly acknowledged by the analysed legislation and the DR 2015. The researcher identifies this as a critical asset management gap that will require attention as part of the requirements of DR 2015 Milestone 1 (Arrest the Decline). New and evolving meaning and understanding through KM initiatives can greatly assist the process of DR 2015 implementation – at least in the medium- to long-term.

Because the SA DOD has to function in a very complex environment, strategic management (decisions, action, effects and advantage) cannot be based on information solely. Strategic management should be grounded in knowledge, which is more dynamic because it is based on evolving meaning as information, interpreted and linked to evolving context and calibrated by skills, experience and value systems.

Another problem adding to the reluctance to engage in KM is the complexity resulting from an integrated SA DOD KMC. A possible reason for this is embedded in complex C2 relationships (boundary management) and possible fear of losing control of certain functions, skills, capabilities and knowledge. This erodes possible efforts to create new meaning due to information and knowledge sharing failures exacerbated by construct dissonance.

A key failure currently in the SA DOD is the failure to contain the 'brain drain'. Skills, experience and organisational knowledge are bountiful in the SA DOD, however, the institutionalised platforms that assist with the sharing of this knowledge is lacking, absent or severely hampered by security requirements. Such platforms are for example communities of practice, blogging and best practice management as used by the USA.

This said; there is a glimmer of hope in the recognition that military intelligence is of strategic importance. However, this recognition has not brought the SA DOD closer to knowledge era thinking and associated practices. The predicament is exacerbated further by the DR 2015 that does not describe an SA DOD KM future; only describing the components of a possible KMC in an unintegrated manner.

There is an unambiguous argument for the construction of a coherent and integrated SA DOD KMC. The argument is based on the motivation provided by Chapters 2 and 3 that KM is crucial to coping with complexity and change stemming from the business and military environments. It is reasonable to propose that a KMC would be a force multiplier for any military organisation. The USA military has already implemented such a proposal. Also, the prevalence of several types of military knowledge in the SA DOD, discussed above, supports this requirement. The fact that the DR 2015 places great emphasis on the development of policy, strategy and doctrine and the establishment of information- and intelligence capabilities provides a critical foundation for the establishment of an SA DOD KMC.

Chapter 5 provided the researcher with themes to inform the research and analysis for chapter 6 of the dissertation. These themes were used to structure the discussion in Chapter 6 of this dissertation, focussing on the research questions. The next chapter of this dissertation focuses on the analysis of a selected sample of SA DOD Level 1 policy and doctrine. This analysis is based on analysis and emerging themes from Chapter 5 of the dissertation, to construct possible answers to the research questions.

CHAPTER 6

SOUTH AFRICAN DEPARTMENT OF DEFENCE KNOWLEDGE MANAGEMENT LEVEL 1 POLICY AND DOCTRINE

6.1 INTRODUCTION

> *"A nation state's power base is built on five key planks: Diplomacy, Information, Military and Economic power and Social cohesion/infrastructure"* (JWP8: 1-11)

The DR 2015 provides a clear understanding of the projected future of the SA DOD of which KM is not part of that future. The researcher could have possibly ended the document analysis with the completion of the sample of legislation and DR 2015 analysis. However, the researcher felt that the knowledge adduced evidence in this dissertation is not representative of the SA DOD policy direction without the analysis and assessment of the SA DOD Level 1 policy database. Elaborating further on the discussion in Chapter 5 of this dissertation, the DR 2015 (4-4) summarises the levels of decision-making in complex environments along the lines of policy, strategy and plans, as -

> "The identification of a hierarchy of defence direction, [C2] does not necessarily intend dogmatic and rigid obedience thereto, but rather provide a practical construct to assist with complex decision-making and judgement by all concerned within a continually evolving and fluctuating environment." DR 2015 (4-4).

This depiction of hierarchy corresponds with the discussion in Chapter 2 of this dissertation on the levels of policy and strategy. The levels of SA DOD decision-making is depicted in Figure 6.1., with Defence policy depicted at the strategic level. Figure 5.1 depicts another view of the interrelationships of Defence policy. From Defence policy all other strategy, plans, procedure, etc. flow (also see SANDFP3 (1-1 to 1-5). Interestingly, doctrine is not included in this graphic, probably fitting on the military strategic level. The graphic gives the reader a sense of where the analysis in Chapters 5 and 6 of the dissertation is focussing.

In order to provide further depth to answers to the dissertation research questions, the researcher analysed a snapshot of SA DOD Level 1 policy, based on the SA DOD policy database (pp_static dated 17 May 2016). This snapshot would also cover the entire period during which the DR 2015 was drafted and ratified. This resulted in very recent SA DOD Level 1 policy and doctrine, forming the foundation of SA DOD management direction, and were thus analysed.

The levels of policy closely correspond to the levels of SA DOD C2 (or decision-making in Figure 6.1) as defined in IDODI1 (A-1 and A-2). It also provides a glimpse at why Level 1 policy and doctrine was selected for this research. The levels of policy are:

> "a. Level 0 – Government Policy. Government Level Policy includes the Constitution, Legislation and Regulations issued by Ministers in terms of Acts of Parliament, White Papers, Position Papers, Cabinet Decisions and Ministerial Directives to the DOD. [The scope of Chapter 5]

b. Level 1 – Departmental Policy. Departmental Level Policy includes all policy issued by the Sec Def and the CSANDF and is obligatory upon all officials in the DOD.

c. Level 2 – Service and Divisional Policy. Service and Divisional Level Policy includes all policy issued by Service and Divisional Chiefs of the DOD and is obligatory upon all officials of the specific Service or Division issuing the policy.

d. Level 3 – Formation Policy. Formation Level Policy includes all policy issued by formation commanders and is obligatory upon all officials of the specific formation. Formations include Type Formations, Support Formations and their equivalents in other Services.

e. Level 4 – Unit Policy. Unit Level Policy includes all policy issued by unit commanders and is obligatory upon all officials of the specific unit. The term "unit" includes combat forces, service centres and regional decentralised offices and depots" (DODI53: 8-9 and SANDFP4: 7)"

Figure 6.1: Levels of Decision-making

Source: DR 2015 (4-4).

Currently, the SA DOD formalises its strategic direction of the organisation by means of Department of Defence Instructions (DODI), which represents SA DOD Level 1 policy. "In the

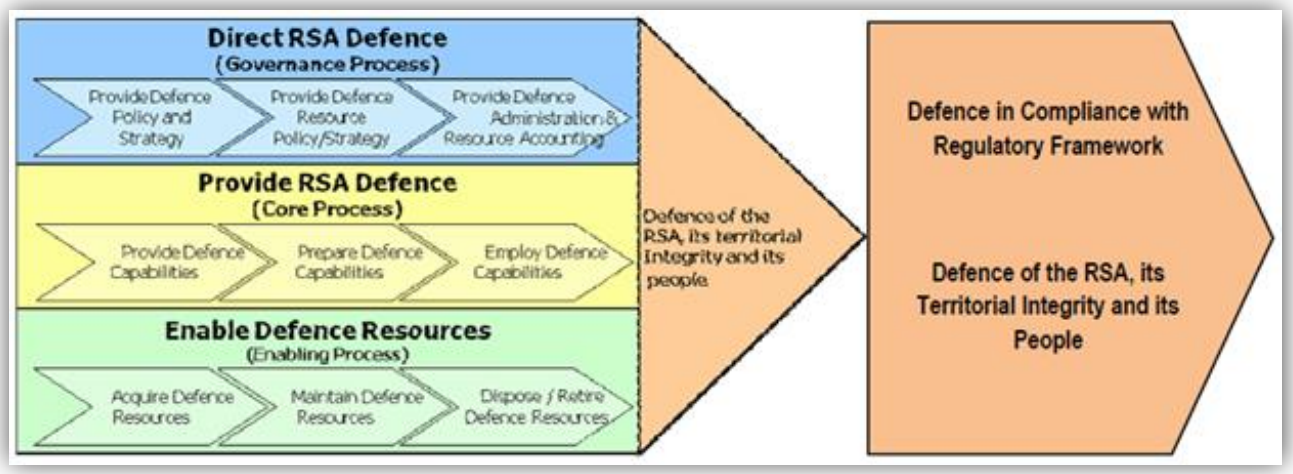
[SA DOD], policies are embedded in [DODI] for the purposes of promulgation. The term policy and instruction may be used interchangeably for any specific policy." IDODI2 (A-2). DODSPF1 (13) defines SA DOD policy as –

> "… the "action-plan" to achieve the same end-state of the Defence Strategy[69]. For a single strategy, there can be a number of defence policies which will direct the formulation and development of subsequent defence strategies and plans from both the core and functional environments (policies regarding human resource recruitment, compensation, main mission equipment acquisition, doctrine etc.) as derived from the Defence Strategy and will support and direct the resources and capabilities of the Department to the achievement of the Defence mandate and related performance information, as articulated through the Defence strategy.".

SANDFP4 (4) defines policy very practically - "Policy is a course of action selected out of various alternatives, that provides the guidelines to be taken in certain defined circumstances". IDODI2 (A-2) and DODI30 (A-3) defines policy as –

> "… a line of action selected out of various alternatives that provides [*sic*] the guidelines to be taken in certain defined circumstances. Policy is based on fixed principles that emerge from strategy and which form the framework for the issuing of instructions or commands for the handling of a given situation. It is authoritative and is normally a determinant of current or future decisions.".

This definition highlights important aspects as to why the researcher analysed SA DOD Level 1 policy for answers about SA DOD knowledge and KM. One such aspect is the statement that SA DOD Level 1 policy provides authoritative guidance to current and future requirements. SA DOD Level 1 policy will thus provide insight as to the current state of SA DOD knowledge and KM, which is important for the findings of the dissertation. Thus, SA DOD policy is clearly decision and action orientated. It also represents the first layer of knowledge within the SA DOD used to authoritatively guide, direct, instruct and manage the decisions and actions to possibly achieve the desired effects.



[69] Strategy is the ways (methods) and means (resources) employed to achieve the aims (outputs) as determined (laid down) by higher level policy. (IDODI2: A-3)

Figure 6.2: SA DOD Value Chain

Source: DODSPF1 (16).

This layer of knowledge (considered as capstone knowledge based on the discussion in this dissertation's Chapter 3 and 5) act in an integrated manner with other critical components of the SA DOD towards the achievement of the SA DOD mandate, as proposed by the SA DOD value chain, depicted by Figure 6.2 above. According to Dr S. Breytenbach[70], the SA DOD policy database still contains various formats of SA DOD Level 1 policy and doctrine. These are -

- SA DOD Level 1 policy associated with the Defence Secretariat - DOD Directives[71] (DODD), Interim DODI (IDODI), Financial Management Division Instructions (FMDI) and DODI; and
- SA DOD Level 1 policy and doctrine associated with CSANDF - SANDF Directives (SANDFD), SANDF Publications (SANDFP[72]), SANDF Orders[73] (SANDFO), Joint Defence Publications (JDP), Joint Warfare Publications (JWP), Joint Warfare Manual (JWM) and Logistics Pamphlets.

Dr Breytenbach states that the SA DOD Policy database contains SA DOD Level 1 policy and doctrine. This view is supported by SANDFP4 (5) –

"The level 1 SANDF policy publications system shall include the following policy instruments:

a. SANDF Directives (SANDFDs) that provide policy required or authorised by the CSANDF, to initiate, direct, or regulate actions or conduct by members of the SANDF and to enforce accountability. Specifically, SANDFDs establish or describe policy direction, outcomes, and assign responsibilities. SANDFDs shall be approved and signed by the CSANDF and endorsed by the SecDef [*sic*].
b. SANDF Orders (SANDFOs) that implement policy, assign responsibility and accountability, and prescribe uniform methods for efficient execution of the policy within the SANDF. A SANDFO implements a SANDFD and shall be approved by the CSANDF for implementation in the SANDF and endorsed by the SecDef [*sic*] for support and execution throughout the [SA DOD] as required.
c. SANDF Publications (SANDFPs). Publications that supplement SANDFOs by providing background to policy; processes and uniform implementation procedures. A SANDFP is authorised by a SANDFO, and its foreword is signed by the CSANDF and endorsed by the SecDef [*sic*] for support and execution throughout the [SA DOD] as required.".

In terms of SANDFP, the following is stated by SANDFP4 (2) -

[70] Dr S. Breytenbach is Director Policy Development in the Policy, Strategy and Planning Division of the SA DOD. The writer consulted Dr Breytenbach on a number of occasions on the technical peculiarities of the policy database and the relationship between policy and doctrine on the database.
[71] Directive. A directive is a communication that initiates or governs action, conduct or procedures. A SANDF Directive will establish or prescribe policy direction, outcomes and assign responsibilities. (SANDFP4: 3)
[72] SANDF Publication. Supplements the SANDFO by providing the processes and procedures for implementation in the SANDF. (SANDFP4: 4)
[73] Order. An order is a written, oral or signal communication, in which tasks and the methods for executing them are communicated from a superior to a subordinate. (Source: CSW) A SANDF order implements policy, assigns responsibility, accountability and prescribes uniform methods for execution of the policy within the SANDF. (SANDFP4: 4)

"The development, promulgation and maintenance of level 1 policy forms part of the overall strategic direction process of the [SA DOD] ["…the overall process that directs the functioning of the [SA DOD] and ensures the realisation of the departmental vision, mission and strategic objectives in accordance with government policy."] Level 1 SANDF policies are authorised by the [CSANDF] as [SANDFO])."

SANDFP4 supports the notion that JDP, JWP, JWM and Logistics Pamphlets are not perceived as SA DOD Level 1 policy. JWP1 (3-4, 6-5, 7-2 and 7-3) equates JWP to doctrine and not policy. Both DODI1 and JWP1 deals with SA DOD corporate communications doctrine; and thus, one might find doctrine in DODI and policy in doctrine. Doctrine must take cognisance of SA DOD policy when being developed. "Doctrine is defined as the fundamental principles by which military forces guide their action in support of objectives. It is authoritative by nature but requires judgement in application." (SANDFP2: 2).

SANDFO4 (4 and 5) provides a hierarchy of SA DOD Joint Doctrine documents, required not to be classified higher than 'restricted, described as a hierarchy within a domain of doctrine – as follows:

"a. Policy Documents. All [DODD], [DODI] and [JDP] as promulgated jointly by the [Sec Def] and the [CSANDF] must be seen as higher order publications that are to be taken into account at all times during the development of Joint Doctrine.

c. [*sic*] [JDP]. This is the overarching term used to describe all Joint Doctrine Publications and may consist of either a [JWP] or a [JWM].

[SANDFP2 (2) states that the - "… aim of this [JDP] is to prescribe policy processes and procedures for the research, development, authorisation, publication, distribution, maintenance, control and management of all [JDP] in the SANDF.". This provides a broader description of JDP but also alludes to knowledge processes important to doctrine management and that there is a nexus between policy and doctrine. SANDFP2 (2) states further linkages to action - "[JDP] are a series of publications issued by CJ Ops at departmental level pertaining to all matters of joint/combined and multinational operations. They provide guidelines for the execution of these joint activities within the SANDF.]

a. [*sic*] [JWP]. These publications cover all those joint warfare and operational aspects that require co-ordination [*sic*] and integration of effort whenever two or more of the Services/Divisions are involved in joint operations. Service/Divisional aspects may be covered when these have a bearing on the joint operations being conducted or, as and when necessary for mutual understanding or as background information. All [JDP] fall within the DOD functional defence publications and will be subordinate to this DODI. They should also be mainly on the Strategic and operational level of war. Exceptions may occur...

[SANDFP2 (2) states "JWP may contain appropriate policy, principles and guidelines for the execution of operations. These publications reside mainly at the organisational level two.". JWP8 (1-6) state that the JWP is doctrine and it provides information about and - "… practical guidance for military commanders, staff and personnel involved at the operational level in peace missions."].

b. [*sic*] Joint Warfare Manuals (JWM). These publications are issued where a document usually resides at the tactical and/or technical level. These manuals describes [*sic*] low level [*sic*]

> doctrinal procedures, tactics, practices and procedures for action and are used mainly by units and members on the tactical level. It will however need co-ordination at a higher level and should usually flow from and are usually attached to a [JWP] although this may not always be the case and some manuals may stand alone.".
>
> SANDFP2 (2) states - "Joint Warfare Manuals are publications issued by CJ Ops that usually reside at the tactical and/or technical level. … These documents would usually flow from and are usually attached to a Joint Warfare Publication. Exceptions may occur where they may be individualistic by nature and may stand alone.".

Therefore, SA DOD Level 1 policy and doctrine are included in the 'doctrinal domain", are regarded as 'higher order publications' to be considered when drafting doctrine. SANDFP2 (1) also states clearly that joint doctrine should not contradict - "… higher order DOD Policy Publications" and - "… other relevant governmental policies", thus clearly separating policy and doctrine.

From the description above - JDP, JWP and JWM do not conform entirely to the selection criteria for SA DOD Level 1 policy but share some of the criteria. JDP is SA DOD Level 1 doctrine and in some instances quasi-SA DOD Level 1 policy. Therefore, based on the identification of military doctrine as capstone military knowledge, the researcher felt compelled to include the relevant selected samples of JDP, JWP and JWM in the document analysis in order to provide insight into the definition and management of doctrine, its nexus with other capstone military knowledge and other possible indications of KM. Thus, for the purpose of this dissertation, the researcher includes the selection of doctrinal publications (i.e. JDP, JWP and JWM) whenever there is a reference to the selected sample of SA DOD Level 1 policy.

All SA DOD Level 1 policies are currently being systematically converted into DODIs. DODIs undergo a lengthy and inclusive development process (SANDFP4: 11-17 and A-1) primarily under the control and direction of the personnel of the Chief of Defence Policy, Strategy and Planning and the SA DOD Policy Board. The Sec Def and CSANDF co-sign DODIs into use.

All SA DOD policies are being published on an SA DOD internal web-based portal. The policy database is managed by staff from Chief Defence Policy, Strategy and Plans with support from SITA. The database separates policy into (1) Government Policy Publications – also referred to as Level 0, (2) DOD Policy Publications – also referred to as Level 1; and (3) Service and Divisional Policy Publications – also referred to as Level 2.

The database features current, promulgated policy and archived (superseded) policy. For the purpose of this dissertation, the researcher focussed on current promulgated DOD policy publications (Level 1 policy).

Based on discussions in the literature review, military KM (dissertation Chapters 2 and 3), the analysis of the SA DOD legislative environment and the DR 2015 (dissertation Chapter 5) the following keywords were selected as search foci for the selected sample of SA DOD Level 1 policy and doctrine – wisdom, knowledge, knowledge management, intelligence, doctrine, IP, information, information management, data, CIO and CKO. After applying the sample criteria discussed in Chapter 4 of the dissertation (including relevant doctrine) the researcher narrowed down the number of policy and doctrinal documents to 125 documents. This was done by opening and inspecting

each document in the folder named 'docs' (containing 9519 files in 32 folders) contained in pp_static dated 17 May 2016 to ascertain compliance with the sample criteria.

The sample contained a selection of DODD, DODI, IDODI, SANDFO, SANDFP, SANDFD, JDP, JWP and JWM. This sample was then further filtered to eliminate duplication and documents that were merged into single DODIs. Each selected document was assigned a dissertation configuration number for identification purposes and to assist with referencing (reflected in Selected Sample of SA DOD Level DODI and Doctrine as part of the dissertation reference administration).

Once the sample of SA DOD Level 1 policy and doctrine were filtered according to the sample criteria the researcher proceeded to analyse each document in turn according to the same search words used for the DR 2015 analysis. The search functionality of the Adobe software was used to do this search and is this not considered perfect, but adequate. The search rendered the following results:

Table 6.1: Knowledge Management vs SA DODI Level 1 Policy and Doctrine Database Selected Sample

Search Word	Number of Documents	Number of Instances	Comment
Wisdom	4	7	The number of instances detailed for keywords such as information and intelligence is exaggerated by the fact that almost each policy document has in the distribution list and elsewhere in the policy document references to organisational posts that refer to these. This is not necessarily the case for the other keywords.
Knowledge	54	457	
Knowledge Management	5	11	
CKO	0	0	
Intelligence	112	631	
Doctrine	56	769	
Intellectual Property	8	157	
Information	114	4820	
Information Management	13	38	
Data	50	662	
CIO	1	1	

The search provided an initial indication of SA DOD interest in knowledge and KM. From the initial search, it is rather evident that the SA DOD is entrenched in IM, as described in chapter 5 of the dissertation. The picture also provides substance to the argument that the SA DOD recognises different types of capstone military knowledge. There is even a surprising reference to KM. With the proposed working definitions for knowledge and KM in mind, let us delve deeper into the SA DOD policy and doctrine for clarity and clues on interest in KM, knowledge to be managed and what is fundamental to the management of such knowledge. The second part of the Reference List provides a coded list of the selected sample used for analysis in Chapter 6 of the dissertation.

6.2 SA DOD LEVEL 1 POLICY AND DOCTRINE: DEEPER ENQUIRY INTO THE SELECTED SAMPLE

As was briefly introduced in Chapter 4 of the dissertation, it is important to note that the following document analysis makes extensive use of quoted text due to the fact that the documents are not in the public domain. Thus, the reader is allowed a glimpse at the actual (sometimes classified restricted and others as confidential) text. No secret or top secret material was used in the crafting of this dissertation.

The researcher did not attempt to analyse each and every keyword occurrence. This would have resulted in an extremely bloated dissertation. Instead, the researcher attempted to extract only broad, relevant evidence that would provide clarity with regard to the research questions. The researcher used the code to refer to or reference the SA DOD policies and doctrine (reflected in Selected Sample of SA DOD Level DODI and Doctrine as part of the dissertation reference administration).

The analysis summarised in brief above resulted in more than 120 pages of extracts and comments which were analysed and synthesised according to the four secondary research questions. The remainder of Chapter 6 of the dissertation reflects on the discussion of the synthesised result of this process following a logic based on the research questions and consolidated themes. The discussion is at times fragmented due to the fact the analysis is based on a word or construct search within a selected sample of SA DOD Level 1 policy and doctrine covering a vast array of subject matter.

6.2.1 Why is the SA DOD Perceived as Disinterested in Knowledge Management?

The following consolidated themes provide a narrative that supports the researcher's assumption that the SA DOD is not interested in coherent and integrated KM. The narrative highlights the fact that the SA DOD is entrenched in the information era and does not seem to regard knowledge as strategic to organisational performance and advantage. Furthermore, the SA DOD does not have approved Level 1 KM policy or doctrine. The existing Level 1 policy and doctrine in existence (based on the selected sample) display considerable construct dissonance in terms of the knowledge continuum. This renders the SA DOD rather paralysed within an information era trench. Other issues that contribute to the view that the SA DOD is not interested in KM relates to the existence and persistence of SA DOD knowledge silos, requiring integration to be able to achieve integrated and coherent KM and KMC.

This is followed by an exploration and discussion on reasons for interest in KM and establishing an SA DOD KMC. This is accomplished with a discussion reflecting on the requirement for knowledge to deal with a complex environment; the vast portfolio of SA DOD knowledge that should be managed in an integrated manner to enhance coherence and the linkages between knowledge, decisions, actions and effect. Based on the requirement for a coherent and integrated SA DOD KMC, the discussion is then advanced stating the types of knowledge to be managed and proposals are made on how this should be accomplished. Let us first discuss the assumption of disinterest.

6.2.1.1 The Information Era Trench

Fundamental to the assumption that the SA DOD is not interested in KM is the fact that the SA DOD is still guided by SA DOD Level 1 policy and doctrine that entrench information era thinking.

JWP8 (1-11) states that a nations' power base is constructed on diplomacy, information, military and economic power and social cohesion/infrastructure, or better known as DIMES. The information dimension of DIMES states that - "The information 'instrument' aims to convey national and/or international intent in an open, accurate and credible manner. Under no circumstances should it be abused or exploited in order to manipulate the media. Some nations believe that 'information' is a common denominator, and can never be separated from any of the other three elements in the DIME[S] equation". JWP8 (2-6, 3A-18, 3A-24) states that information is one of the key elements underlying the success of a nation-state. The above is a typical information age look at the strategic lines of operation. Currently, knowledge should be in the place of information as a power base for reasons stated in Chapter 2 of the dissertation on the importance of knowledge within the context of advantage. A fundamental reason why the SA DOD does not regard knowledge as the important driver to advantage is explicit recognition of the information era and not the knowledge era –

> "The [SANDF] Military Strategy developed in an environment that has gone through, and is going through, a number [6] of drastic and influential environmental shocks[74]. … The fourth shock is a revolution that a number of military theorists call the [RMA]. Since 1990 the rhetoric on this subject had no real effect as military equipment and doctrine have undergone many revolutionary changes. The fifth is the movement of the [SANDF] from an agrarian and industrial era, into the information era. Standing on the verge of the 'biotechnological economical' era, the Defence Force has to position its policies, strategies and doctrine in such a way that it will be able to function within new and changing circumstances. The South African Government has and is embarking on a strong idealistic road in its support to the [African Union / New Partnership for African Development] impetus on building peace, stability and security on the Continent. This sixth shock is challenging the SANDF to strategise strategic capabilities in support of Peace Missions and complying with our Constitutional Mandate "… to defend and protect …" the Republic". (SANDFP3: 1-1)

SANDFP3 was promulgated in 2008, well after the international community commenced migrating to and applying knowledge era constructs such as KM. Yet, and within the context of strategic shocks, no mention is made that the world is moving towards or is in the knowledge era. The policy writer dismissed the effect of RMA, yet, part of the RMA is the effective use of intelligence and its networked integration and constructs such as effects-based operations and warfare. RMA is part of the beginning of military KM - which is discarded as not important by SANDFP3. However, when considering the definition offered by SANDFP3 (15-13) of RMA - "… phenomenon that occurs when a significant discontinuous increase in military capability is created by the innovative interaction of new technologies, doctrine, operational concepts, and organisational structures" - RMA seems significant.

[74] The first three shocks is not regarded as relevant to this discussion by the researcher.

RMA was discussed in Chapter 3 of the dissertation. What is also significant is the source that this quote was taken from – "Pursuing the Real Revolution in Military Affairs: Exploiting Knowledge-Based Warfare[75]". Thus, the writer of SANDFP3 probably read material dating back to 2000 about the concept of KW. Yet, KW was not considered in SANDFP3.

It also states that RMA did not have a real effect due to changes in doctrine. This assumption has had a significant impact on the way the SA DOD give effect to its mandate. The SA DOD takes its strategic guidance from policy and doctrine trapped within the context of the information era and not with more current paradigms driving the knowledge era.

Another critical issue mentioned by the policy writer is that policy, strategy and doctrine will have to adapt to environmental change – the policy writer makes no mention of information that will have to adapt. This is probably based on the understanding that environmental changes and strategic shocks provide new data/information that needs processing in order to inform the formulation of capstone military knowledge. In the information era, this would be attempted with IM, focussing heavily on IT. In the knowledge era, this is managed by KM models and toolsets, focussing more on IC with IT only in an enabling role. SANDFP3 and other policy and doctrine state that the RSA/SA DOD is in the information era supporting the researcher's assumption that the SA DOD is not interested in KM and the establishment of an SA KMC.

Paradoxically, JDP13 is the only SA DOD Level 1 policy/doctrine within the selected sample that refers to the 'knowledge economy', a construct discussed in the literature review (dissertation Chapter 2) and implicit in the knowledge era. This SA DOD policy was promulgated in October 2006. The context of the policy is career development, a key component of HRM -

> "The rise of a service and knowledge economy has resulted in more flexible labour relations that are still expanding. … The strategy followed [by JDP13] not only focuses on the establishment of a more dynamic knowledge development environment, but also on the modernisation of the career development model. It recognises that, in a knowledge environment, the lower-skilled workers are at risk." (JDP13: 1).

Therefore, the understanding is that the world is in, or moving towards, a knowledge era and knowledge economy already existed in the SA DOD whilst JDP13 was under development (circa 2006). This existed at least within the SA DOD HRM context (which by-the-by is a large and fundamental component of KM). However, this knowledge or understanding (unfortunately) did not permeate down into the drafting and updating of the DR 2015 and most SA DOD Level 1 policy and doctrine since 2006. Consequently, SA DOD Level 1 policy and doctrine did very little to lift the SA DOD from the information era trench thinking and practice for the foreseeable future. This predicament is reflected in the DR 2015 (as the SA DOD vision, policy and in some aspects strategy and plan for the next 20 years) which is based on current policy and doctrine and new or emerging; KM conspicuous by its absence.

JWP4 (6-1 and 2) and SANDFP3 (15-7) states that the "Information Onslaught" is an onslaught on -"… South Africa's information, information-based processes and information

[75] P.K. van Riper and F.G. Hoffman, Pursuing the Real Revolution in Military Affairs: Exploiting Knowledge-Based Warfare, in R.M. Lloyd *et al*, Strategy and Force Planning, Third edition, Newport: Naval War College Press, 2000, p. 639, mutatis mutandis.

systems. [JWP8 (1A-2) also refer to the information onslaught]. It includes psychological operations, media relations and civil [possibly rather civic] affairs". This is based on - "The principles of war for the information age"[76], which clearly indicate that the SA DOD is still contemplating information age doctrine instead of developing knowledge age doctrine – possibly labelled 'Knowledge Onslaught or Knowledge Domination'. It is possible for this reason that the SA DOD still prescribes to policy and doctrine regarding InfoOps, -Campaigns and -Warfare – discussed later in this chapter.

IDODI2 (1 and 2) states within the context of performance measurement that information in the SA DOD should be used "… strategically to improve policy and funding choices, and to enable accountability… Performance information is increasingly playing a significant role in informing budget allocations, monitoring of service delivery and value for money". IDODI2 (5) defines performance information as – "…a generic term for non-financial information about government services and activities". IDODI2 (7) states that the Sec Def (SA DOD Accounting Officer and CIO) is accountable for establishing and managing systems for the management of performance information in the SA DOD.

Another type of performance management prescribed by the SA DOD is in IDODI2 (8), stating that – "Results based [*sic*] management is a life-cycle approach to management that integrates strategy, people, resources, processes and measurements to improve decision-making. Results based management also involves monitoring, evaluation and reporting on results through the development and provision of integrated financial and non-financial information.". DODSPF1 (15) states the SA DOD resources in the strategy map. This confirms that information and intelligence are perceived as recourses.

It is well recognised that 'to measure is to know'. However, once performance statistics have been collected and processed, the results should be integrated with other knowledge continuum artefacts in order to arrive at actionable, decision-quality knowledge. The paragraphs above let the reader believe that performance data and information is enough to base decisions about performance and resource management improvement on.

IDODI2 (12) states that – "At any given time within government, information from multiple years is being considered". Also, "Strategic plans include high level [sic] information on outcomes and outputs with five-year targets, whereas annual performance plans provide details of outputs and indicators with targets for the current year and the medium term period". This confirms that time is an important factor when working with knowledge continuum artefacts.

IDODI2 (12) states that during the process of collating performance information – "The performance data must then be collated and aggregated to such an extent that it provides information that can be analysed on the applicable level of the organisation. Sifting through mountains of data must be avoided as this will discourage decision makers [*sic*] to refer to performance results in the decision-making process.". IDODI2 (28) states the following about performance information -

> "82. The public sector delivers services essential to the well-being and development of the nation. To ensure that public service delivery is as efficient and economical as possible, all

[76] Leonard, R.R. 1998. *The principles of war for the information age*. Novato: Presidio, p. 22.

> government institutions are required to formulate strategic plans, allocate resources to the implementation of those plans, and monitor and report the results. Performance information is essential to the public and oversight bodies on whether government departments are delivering value for money, by comparing their performance against their budgets and service delivery plans, and to alert managers to areas where corrective action is required. [These statements positions information correctly – i.e. to inform. The notion of information being used 'strategically" can possibly be confused with being used 'effectively'. However, in the absence of knowledge (e.g. policy, doctrine, intelligence and IP) the organisation will have to revert to information as the lone alternative.]
>
> 83. Performance information indicates how well an institution is achieving its outcomes and outputs in the execution of its mandate and is key to effective management, including planning, budgeting, implementation, monitoring and evaluation. Performance information also plays a growing role in budget allocations and will increasingly be used to monitor service delivery. This means the information must be accurate, appropriate and timely.
>
> 84. Monitoring and evaluation pre-supposes an openness to continuously evaluate the success of what we are doing, diagnose the causes of problems and devise appropriate and creative solutions. Monitoring and evaluation can, however, only be influential if it provides quality analytical information and if decision-makers are willing to consider and act on that information".

In a similar vein DODI29 (A-1) states that information is important in the process of risk analysis.

These paragraphs speak to the knowledge continuum that, if approached or aggregated incorrectly, will negatively impact decision-making, action and effect. It goes hand-in-hand with the time value of knowledge continuum artefacts above. The information must also be of a particular quality. The information used is important to assure service delivery, "well-being and development" of South Africa – which is the desired effect. This makes performance information important from a national interest perspective. In order to enhance the decision-action-effect cycle, this information should be converted into knowledge by the organisation. If processed incorrectly the knowledge might be too late for meaningful impact. The element of timing is fundamental when considering survival and advantage. If the SA DOD bases decisions on poorly aggregated data and information, survival and winning become problematic. It is for this reason that an SA DOD KMC is proposed.

IDODI2 (28) states that performance information is "… essential to the public and oversight bodies on whether government departments are delivering value for money, by comparing their performance against their budgets and service delivery plans, and to alert managers to areas where corrective action is required". Performance data and information are, however, lagging indicators – or after the fact. The government places undue emphasis on this type of information because of the responsibility to account, based on the PFMA, for the resources used. From a corporate perspective, business intelligence is also gainfully developed and employed to enhance performance. However, as a remnant of the information era, governments using business intelligence are probably still just using data and information packaged as intelligence. Militaries continuously enhance policy, intelligence and doctrine to increase performance. The researcher is of the opinion that the preoccupation with lagging indicators (such as financial data) lures the focus away from the

importance of converting data and information into knowledge that could be used to enhance performance and advantage which should over time improve performance significantly.

In the observation of the researcher, government (more specifically the SA DOD) seems more interested in past performance (based on data and information) - than how to perform better (knowledge-based and enabled). This predicament is driven by the entrenchment of information era management principles.

JDP9 (6 and 9) refers to the South African National Standard (SANS) 15489-1:2004 Edition 1 (ISO 15489-1:2001 Edition 1) Information and Documentation - Records Management, Part 1 General. The SA DOD conducts IM as prescribed by national standards. The question is – is there a national standard for KM in the RSA yet? The researcher could find none. This may then transfer the onus to the SA DOD to develop their standard until such time that a national standard for KM is developed. This dissertation endeavour to develop a clear understanding of the future SA DOD KM and KMC requirements, as a starting point.

6.2.1.2 Misunderstanding about Value and Function

The SA DOD regards information as strategic and paramount to its decisions, action, effects and advantage. There is limited acknowledgement, in isolated policy expressions, that knowledge as a construct is strategic. This contributes to the perception that the SA DOD is not interested in KM. This predicament reinforces the SA DOD's foothold in the information era and its associated IM practices. There are several policy expressions supporting these views. Consider the following policy statements –

> "The [SANDF] Military Strategy … as well as the Public Service Act, Proclamation 103 of 1994 as amended … recognise information as a strategic resource. The confidentiality, integrity and availability of timely and accurate information are thus paramount in sound decision making. As such, information warrants a similar degree and level of management and protection as any other strategic resource." (DODD10: 2 and DODD4: 2).
>
> "The [SA DOD] views and addresses information as a strategic resource that needs to be managed effectively and efficiently throughout its lifecycle,…" (DODD4: 1).
>
> "The [SA DOD] Information Strategy … and Information Management Philosophy[77] for the [SA DOD] endorses information as a strategic resource in support of the [SA DOD] business as it forms the basis for decision-making and effective management. It also emphasises the strategic importance that the resource "information" is managed over its total life cycle in an effective and standardised manner in order to support the [SA DOD] in gaining a competitive advantage". (JDP9: 1 and 8, JDP9: 8, DODI9: 2 and DODI57: 2).
>
> "The Military Strategy …, Force Employment Strategy … and the [SA DOD] Information Strategy … are [SA DOD] strategic documents that also emphasize the importance of information for decision-making in the SANDF. These strategic documents stipulate that in the context of multi-discipline approach, the SANDF will execute SANDF authorised missions jointly, inter-departmentally and multi-nationally. In an attempt to enhance interoperability, the use of frequencies in the execution of SANDF missions becomes a necessity because radio

[77] DODI9 (1) and JDP9 (1 and A-1) also reference the Information Management Philosophy.

communications is [*sic*] one of the robust technological communication means which plays a most important role in making information exchange possible". (SANDFO3: 1).

"Information is managed as a strategic resource within the [SA DOD] and therefore the discipline of [IM] is effectively and efficiently practised. Software enables the utilisation of information." (DODI24: 19).

"… considered a strategic resource in the [SA DOD] as it forms the basis for decision-making and effective management". (DODI30: 5-8).

The picture is clear. Information is strategic; it is linked to decision-making, action, effects and advantage. Nothing in these texts states the same of knowledge or hint that there are more to this than meet the eye – such as a knowledge continuum for example. Furthering this stagnation in the information era, DODI39 (2) and DODI57 (2) (amongst others) refer to an Information Strategy –

"The DS/DEISMD/R/516/B: Information Strategy v3.2 dd 18 Jan 2010 … is applicable to [DODI39] in that it presents principles, characteristics and implementation guidelines for managing and utilising information as a strategic resource throughout its life cycle. The Strategy further states that the value of information lies in the usage thereof, which means that just having the required information available is not good enough as it must be used for the purpose it was intended for. Information on the [SA DOD] Intranet must therefore be managed as a strategic resource over its life cycle and utilised according to its purpose. ... The Information and Communication Technology Strategy, Version 1.0, approved on 24 October 2011 … is applicable to [DODI39]. It states that Information Communication Technology (ICT[78]) is all the aspects of technology which are used to manage and support the efficient gathering and utilisation of information as a strategic resource." (DODI39: 2).

Interestingly enough, the word 'knowledge' is not mentioned once in SANDFO1 (Policy on the South African National Defence Force Military Strategy). However, in SANDFP3 (xiv, 11-1) – The South African National Defence Force Military Strategy is referenced as describing the battlespace in terms of "… knowledge of the strategic environment in which the [SANDF] could be expected to operate, in order to achieve its Military Strategic Objectives (Ends).". Thus the strategy is regarded as knowledge yet the SA DOD regards its information as strategic.

The policy statements above are evidence of the entrenchment in the information era and that information is regarded strategic in SA DOD Level 1 policy, doctrine and strategy, which are capstone knowledge. This is also articulated in the DR 2015. The information strategy referred to above (dated 2010) corresponds well to the time KM started to gain maturity in propagating the position that knowledge is the driver of organisational advantage.

DODI43 provides a detailed account of the importance of information to the SA DOD Senior Management System (SMS). It states the requirement for information for SMS personnel to execute their jobs and provide much insight into the amount of information required to appoint SMS members. This may be so, however, no indication is given what knowledge is required.

[78] IDODI1 (A-3 and A-4) defines ICT as – "Hardware or software of computers and other communication devices used in or which could have an impact on the military environment".

Based on the discussion about construct dissonance later in the chapter, the researcher assumes that information also includes knowledge. If not, the SA DOD SMS system will require optimisation to ensure the relevant SA DOD knowledge is also considered.

Some SA DOD Level 1 policy and doctrine from the selected sample even stretch as far as classifying data as a strategic resource. DODI39 (A-5) classifies data as strategic from the perspective of intranet services with the following definition – "Strategic Resource. A carefully designed or planned means that is available to system users, including computational power, programs, data files, and storage capacity to provide a particular purpose or advantage".

Contrary to the policy and doctrinal expressions above, internationally knowledge is regarded as a strategic resource and not as information. The information era thinking is clearly visible in these statements. The policy and doctrine statements above contribute to SA DOD entrenchment in the information era, hampering advancement to the knowledge age and KM. They also contributed and reinforced the DR 2015 position on the strategic nature of information and IM. According to the literature review (dissertation Chapter 2); the business world has moved away from this thinking since the early 2000s; recognising knowledge as the advantage driver for business. Militaries such as the USA military strive towards knowledge superiority.

SANDFP3 (10-3) states within the context of - "… an appropriate technological edge" and the SA DOD requirements for situational awareness and information assurance that - "Information superiority is a key enabler to operational success. It must create niche competencies that can assure that forces can acquire, verify, protect and assimilate information to effectively neutralise and dominate adversary forces". The policy statement above seems to position information as the driving force behind operational success and niche competencies, which might be a contentious position from the information era. The USA military is moving towards the concept of knowledge superiority within the context of KW and operations. It is widely accepted by militaries that operational success is achievable with superior intelligence-based decisions, actions and effects. Superior information might add to the quality of the intelligence or the uniqueness of the technology being developed.

The policy and doctrine statements above are fundamental to the SA DOD psyche about the value of information versus knowledge. They also inform management decisions within the SA DOD. In the SA DOD IM takes priority. KM is not considered or practised (at least not coherently as will be discussed later in this chapter). Thus, it might not be a case of not being interested in KM but more a case of being hostage to outdated paradigms cast in legislation, policy, doctrine and strategy.

However, some isolated policy expressions on the importance of knowledge (whether it be e.g. policy, doctrine, intelligence and/or IP) also exists. DODI25 (20) acknowledges that knowledge is a - "… fundamental ingredient for dynamic competitiveness". Doctrine is also stated as providing strategic direction to operations (DODI1: 4-1), providing practical support for the idea that knowledge is strategic in nature. Doctrine is also pivotal in advising strategic SA DOD leadership (i.e. the MOD, Sec Def and CSANDF) on matters of corporate communication (and any other POSTEDFILTB function for that matter). So it would seem that the SA DOD is in two minds about the value of its knowledge. This will have a negative effect on the performance and

advantage of the SA DOD. This might, however, be due to construct dissonance within the SA DOD Level 1 policy and doctrine framework.

DODI30 (2) states the importance of SA DOD information, personnel, infrastructure and material assets (these are all considered resources) and JDP1 (5C-1) distinguishes between knowledge and resources. DODI26 (2, 4) states that information is an SA DOD resource but fail to make mention of knowledge as a resource within the context of business process management. DODI30 (2) does not support the importance of knowledge as an asset or strategic capability, either deliberately or inadvertently. Adding fuel to the fire, DODI57 (2) states that certain information quality is paramount for decision-making and strategic military capabilities. This is problematic when knowledge is not even perceived as a resource in SA DOD Level 1 policy and doctrine. Considering the discussion in the literature review and the military KM (dissertation Chapters 2 and 3), knowledge is probably currently the most important resource (typically labelled as an asset) and strategic capability organisations have distinctly linked to competitive advantage. If not included in the resource-based view of the organisation, it might not be efficient and effectively managed.

JDP4 (D2-11) states that the SA DOD management information philosophy is – "Information is regarded and managed as a resource, a crucial organisational asset that has many attributes and characteristics that are similar to those of other corporate resources – financial, human, physical and natural.". No mention of knowledge. Thus, the proposed SA DOD KM leadership philosophy is 'the art of knowing and the science of managing that knowledge to obtain and sustain advantage'.

JDP4 (D2-11) states further that - "The management of information as a resource in the DOD includes the management of information handling technologies (physical assets). It includes the content of the information itself in terms of accuracy, completeness, reliability, timeliness and usefulness. It is essential to decision-makers and problem solvers at all levels to achieve their respective objectives".

This is relatively misguided. All assets are resources, but all resources are not necessarily assets. Information is rarely an asset, but probably a resource. Knowledge is an asset (e.g. doctrine, intelligence and IP). Also, information has a time-value. Its value rarely increases over time but rather diminishes. The fact that careful record keeping is done does not increase the value of the information, just its configured availability. Instead, the organisation is experiencing a continuous outflow of financial resources to ensure information of diminishing and/or no value is stored. This predicament could be mitigated with a KMC.

Having reviewed some strategic misunderstandings above, misunderstanding permeates to the SA DOD capabilities. SA DOD decisions, actions, effect and advantage are dependent on military capability. The SA DOD has several capabilities. DODERFM1 (5-2 and 5-3) identifies data and information as key SA DOD capabilities. No mention of SA DOD knowledge as a capability is made. The researcher is not convinced that data, information or knowledge are capabilities. They are resources that are part of capabilities, with knowledge being the strategic resource. Managing the knowledge continuum in a coherent and integrated manner to the SA DODs' advantage could be considered a capability, i.e. SA DOD KMC. To substantiate this opinion consider the discussion below.

SANDFP3 (x) states that military strategic capabilities are people, matériel and procedures. At the military strategic level, procedures might not necessarily be a strategic capability but rather capstone military knowledge as found in policy, doctrine, intelligence and/or IP.

SANDFP3 (15-2) and JWP1 (9-1) define a capability as the – "Potential to carry out prescribed actions or operations or to render services or deliver matériel. A capability captures the elements of personnel, organisation, support, technology, equipment, doctrine, facilities, information and training". When describing SA DOD functional capabilities the acronym POSTEDFIT (Personnel, Organisation, Strategy, Training, Equipment, Doctrine, Facilities, Information and Technology) is used (DODI26: A-1 and others). JWP1 (8-1 and 9-7) – "DOD Corporate Communication (Corp Com) has its own capabilities, namely People, Organisation, Sustainment, Training, Equipment, Doctrine, Facilities, Information and Technology (POSTEDFIT), …".

SANDFO2 (2-1 and A-1) adds "Budget" to the acronym POSTEDFIT(B). This is also used in the DR 2015. Another version of the acronym is found in JWP4 (4-6). The 'I' in this version is for IT, explaining that IT empowers members – "… to be empowered and enabled with all tactical, operational and strategic information". Information technology might actually be the capability rather than the artefacts it manages – i.e. information. According to the DR 2015, POSTEDFIT does not include intelligence (dissertation Chapter 5).

In the spirit of having contradictory policy positions on knowledge related matters, DODI40 (24) replaces information in POSTEDFIT, with intelligence. DODI40 (24-25) states that data and information are important factors in the 'I' in POSTEDFIT. DODI40 (25) states information as being part of the support and the intelligence functions in the acronym POSTEDFIT. The 'I', representing intelligence, is defined from the perspective of a user system as - "The characteristics of defence intelligence, information, data and data processing systems required, including content, timeliness, presentation, format, reliability, compatibility, validity, data correlation and fusion.". This definition separates the constructs intelligence, information and data as is the case with several other SA DOD Level 1 policy and doctrine from the selected sample. The policy position of DODI40 also seems to be more inclusive than that of DODI26 (A-1). Thus, even amongst the SA DOD functional capabilities, there is dissonance regarding what the 'I' represents. The question should be raised – which is it, information or intelligence or both? Again, the researcher would argue that information and intelligence are not capabilities but rather artefacts stemming from several capabilities. Intelligence, from a cognitive and process perspective, is a military capability that produces various levels of intelligence through the intelligence cycle processing of information and data. It is also military intelligence that enhances decisions, actions, effects and advantage rather than information or data.

SANDFP3 then expands on the statements about capability in SANDFP3 (xvii and xviii) that military strategic capabilities are (amongst others mentioned) C^4I^3RS (Command, Control, Communications, Computers, Intelligence, Information, Infrastructure, Reconnaissance and Surveillance). SANDFP3 (15-2) states under the heading "Business Strategy" – "C^4I^3RS is a collective description consisting of the elements of command and control, communications, computers, information, intelligence, infrastructure, reconnaissance and surveillance. It is the essential military sensory capability, command and control support for the whole range of military

missions". Intelligence is a capability from a cognitive and process perspective but not from an artefact perspective. Intelligence as a knowledge artefact is regarded as capstone military knowledge. For example, JWP8 (6C-6) states that intelligence is a critical part of the defensive mechanisms available to humanitarian actors (i.e. those people involved in PSOs).

DODI1 (4-12) states the importance of intelligence for the environmental scanning process that determines changes impacting the strategic planning process. This provides more support to the importance of capstone military knowledge in key organisational processes. However, if it is considered that there are several policies (SANDFP4: L-1, DODI26: 17, JDP9: D-5) that support the definition that information includes all knowledge, then the 'I' can represent information – which does seem to be the case. Consider the discussion to follow below on the dissonance that exists within the SA DOD on the constructs data, information and knowledge.

SANDFP3 (11-17) states within the context of IW that knowledge can be turned into a capability. There are a number of intelligence related operational concepts in IW. Yet, throughout the paragraph, IW is described as the use of information as a weapon, and not knowledge. Knowledge, mentioned as part of the IW construct, is also pitched as an equaliser on the battlefield and not information. Also, mention is made of "advanced technology" as a requirement for effective IW. Earlier SANDFP3 stated that technology is knowledge. So, it could be reasonably assumed that knowledge is important for IW, although the intention of IW – to disrupt, destroy or neutralise the information capability of the adversary – is vastly different from a concept such as KW which would target every aspect of technology and the knowledge continuum. Due to construct dissonance, the understanding of these issues will result in varied applications with resulting anomalies in decisions, actions, effects and a possible loss of advantage. There is a clear requirement for KW policy and doctrine to provide coherence and integration to these types of operations as the paradigm shift towards knowledge.

Although IW is regarded as a military strategic capability, information is not a military strategic capability but a product of several military strategic capabilities in action, for example, information gathered by sensors during the application of military surveillance capabilities during operations. C^4I^3RS includes both information and intelligence but no other capstone knowledge such as policy, doctrine and IP. It also does not speak of matériel and procedures as in SANDFP3 (x). However, C^4I^3RS includes people, matériel and procedures in various configurations, which by themselves are not capabilities but inherent in capabilities. The policy position that military strategic capabilities are (amongst others) C^4I^3RS as per SANDFP3 (xvii) is supported by several other SA DOD Level 1 policies.

DODI40 (16) and SANDFP3 (13-1, 13-2 and 15-2) state within the context of C^4I^3RS that both information and intelligence is part of a joint strategic capability. Jointness requires integration. SANDFP3 (13-1) describes this joint strategic capability as - "C^4I^3RS Strategic Capability (the knowledge edge/foresight)"[79]. It does not call for an 'information edge' but rather a 'knowledge edge', which is in essence military advantage. Yet, from the discussion thus far only

[79] SANDFP3 (xvii) states that "C^4I^2RS" [note- only I^2 instead of I^3 as previously stated above) is essential for the entire range of military missions. It is not clear which of the 'I' is not important for long range missions – or if it is just a typing error.

information and intelligence are regarded as strategic by the SA DOD. No mention is made of other capstone military knowledge. There is thus limited recognition of the strategic nature of what is regarded as capstone knowledge. Although intelligence is considered capstone military knowledge, military knowledge is much broader than that. For example, IP is capstone military knowledge that stems from and feeds technology, yet IP is not stated as part of SA DOD strategic capabilities. The SA DOD will only achieve competitive advantage or military advantage if the different types of military knowledge are managed in a coherent and integrated manner towards achieving new and evolving meaning.

SANDFP3 (10-2) states the following about information requirements to remain technologically advanced and to develop credible military capabilities –

> "To fulfill [*sic*] the constitutional obligations of the SANDF, the military must be able to execute the full range of military operations, from humanitarian assistance to major warfighting. An important element of achieving this will be the ability to acquire appropriate information in order to timely initiates [*sic*] the development of credible capabilities that will successfully address the military requirements. Defence related [*sic*] research and technology development need [*sic*] to meet new and undefined threats in the complex battle space of the future. Technology to be used in capability superiority must be a principal characteristic of our military advantage.".

So, the SA DOD is attempting to achieve capability superiority with the development of technologies based on 'appropriate information'. However, technological advantage is achieved with the development of superior IP, which is capstone military knowledge. The failure of the policy statement to correctly contextualise information as an enabler or building block in the knowledge continuum upon which capabilities and advantage should be based seek to create the perception that it is the function of information – which it is not. This might be due to construct dissonance resulting from entrenched information era thinking and understanding.

DODI23 expresses SA DOD IP management policy with specific reference to ownership, disposal, income, royalties and revenue, protection and recording of IP. DODI23 (vi, viii and 1) states a management focus shift from SA DOD IP to SA DOD Intangible Capital Assets (ICA). Currently, IA is the umbrella term for, amongst other things, SA DOD IP. It is acknowledged that the SA DOD focuses strategically on IP management to protect military strategic value. This is an important knowledge era acknowledgement – i.e. that strategic value is based on knowledge (in this case IP) and not information. The following quote illustrates this -

> "The purpose of the management of defence matériel related IP is
> a. to protect and manage the military advantage that is locked up in defence matériel related IP in favour of the Department;
> b. to ensure defence matériel related IP with military strategic advantage is secure for use by the Department, the defence related industry and the defence research institutes to leverage strategic business and military advantage when required;…" (DODI23: 1).
>
> "… IP management … is strongly focused on military strategic need and the management of military strategic advantage." DODI23 (6, 7 and 10).

The same opinion holds for other SA DOD IP. DODI28 (8) states that the SA DOD has an ergonomics database that contains SA DOD IP.

> "The ergonomics database is viewed as a strategic asset to the DOD. It contains subject specific [*sic*] [IP], knowledge, research information, strategic personnel and job profiles, Defence ergonomics best practices and analysed operational data. Specific RSA Defence ergonomics information (RSA-Mil-Documents) is available on the ARMSCOR website at http//armscor.co.za.".

This policy statement strongly reinforces the discussion above on IP. It also raises questions about the coherent and integrated management of this knowledge. The SA DOD might not get the full benefit of capstone knowledge that is managed in silos. From the quotes above it is clear that SA DOD IP is regarded as strategic and inextricably linked to military advantage. This view is supported by discussions earlier in the dissertation. The policy statements on IP above provide a glimmer of evidence that the SA DOD might not entirely be apathetic to the idea of KM. However, IP is not included (probably erroneously) as a military strategic capability in C^4I^3RS.

Once the SA DOD has adopted KM as the preferred way forward, then the capability acronyms of POSTEDFIT(B) must become POSTEFKTB - (Personnel, Organisation, Strategy, Training, Equipment, Facilities, Knowledge, Technology and Budget). C^4I^3RS must become C^4IKRS - (Command, Control, Communications, Computers, Infrastructure, Knowledge, Reconnaissance and Surveillance). This will better facilitate leadership in the art of knowing and the science of managing that knowledge to obtain and sustain advantage. There might be other military concepts that will require review for relevance in the knowledge era. Such review is outside the scope of this dissertation but is a possible research question for future research.

6.2.1.3 Strategic Management Requirements

DODSPF1 (7) states that the SA DOD Strategic Planning Framework (SPF) should (amongst other things) deliver - "… strategically focused and managed Defence performance [IM] in support of the Defence mandate and priorities of Government.". DODSPF1 (15) links the SA DOD Balance Score Card to its performance IM system. The strategy map as an output of the Balance Score Card states the importance of - "… integrated and reliable information and intelligence management" (R3, third line) as SA DOD resources (left column, third line) - but says nothing about other SA DOD capstone knowledge from a resource perspective. It does, however, require "doctrine renewal" (F2, fourth line), thus implying that doctrine is a resource currently under management which requires continuous renewal. In this there is a glimmer of hope, depicted in Figure 6.3 below -

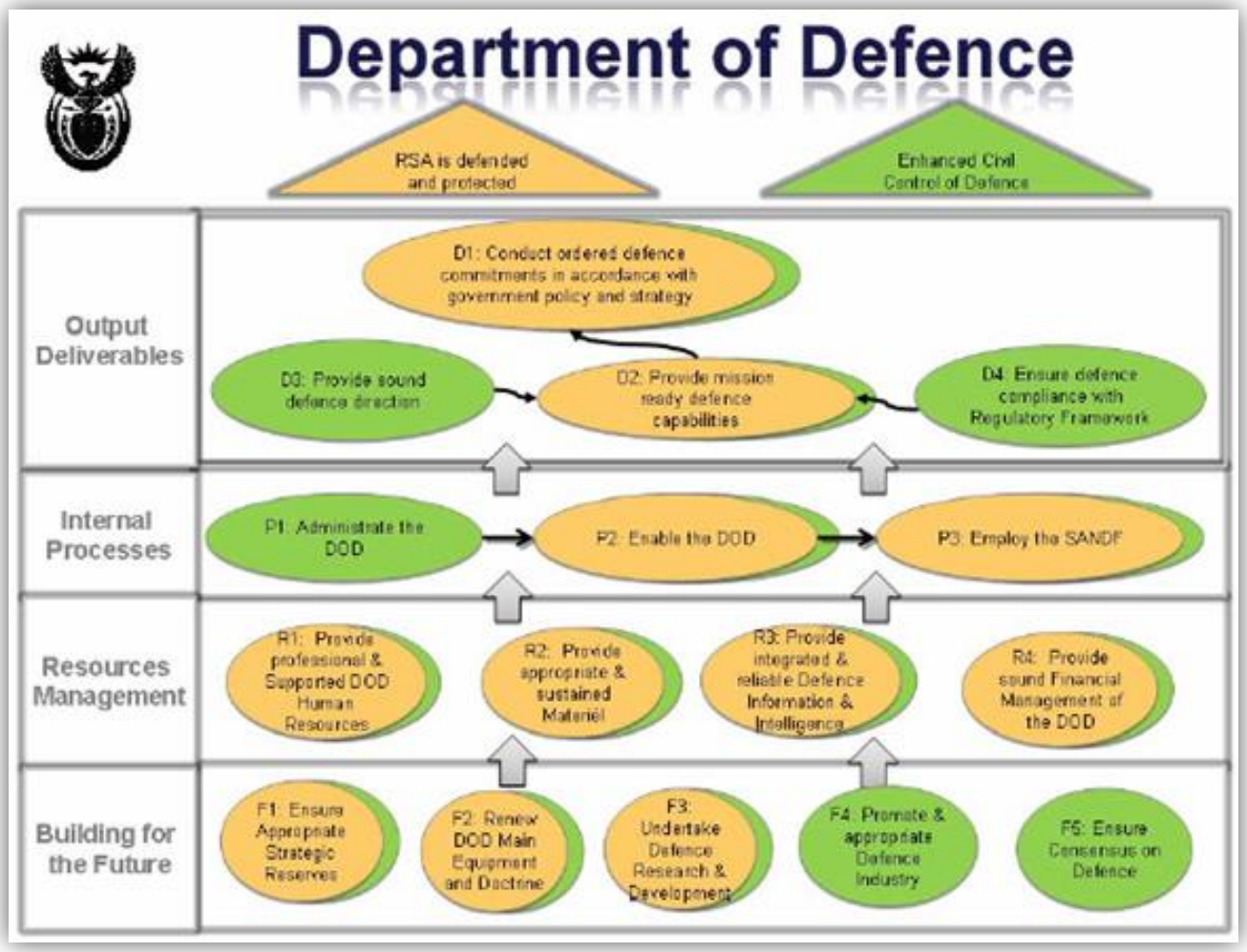


Figure 6.3: DOD Strategy Map

Source: DODSPF1 (15).

The SA DOD SPF thus makes provision for information- and intelligence- and doctrine management explicitly and implicitly. These are not only regarded as military strategic capabilities but also key resources. If it is considered that defence "matériel" (R2, third line) includes the responsibility for SA DOD IP management, then the SPF makes explicit provision for the management of most capstone military knowledge {policy is not mentioned explicitly but is probably represented in D1 (Level 0) and D3 (Level 1-4)} – but not in a coherent and integrated manner. Information, intelligence, doctrine, IP and policy are also linked to 'action' in D1, which express the need to - "… conduct ordered defence commitments". Thus, knowledge forms the backbone of several components of the SA DOD SPF based on the strategy map. Yet, the SA DOD does not have a KMC and thus does not engage in coherent and integrated KM. A silo approach seems to be predominant. With the recognition of the knowledge era, this strategy map will probably change in many aspects, highlighting more explicitly the SA DOD knowledge continuum and its significance.

6.2.1.4 Knowledge Management Policy and/or Doctrine Vacuum

This is a significant contributing factor to the perception that the SA DOD is not interested in KM. The DR 2015 (Level 0 policy) does not express the need for KM. Furthermore, the selected

sample SA DOD Level 1 policy and doctrine contains no KM policy or KM doctrine and there is no reason to expect that such documents will be found outside the selected sample. There is no policy that describes a KMC. There are several policies on the management of different kinds of SA DOD knowledge (e.g. intelligence, HRM, finances, acquisition, IP, etc.) – these are discussed below. Without a KMC and a KM model stating the *raison d'être* of SA DOD KM; elaborating on the vision, role-players, the objectives, types of knowledge to be managed, processes and critical success factors; the SA DOD will fall short of a coherent and integrated approach to managing the knowledge continuum, negatively affecting decisions, action and eroding military advantage.

6.2.1.5 Knowledge Management as a Senior Management Requirement

JDP20 makes mention of KM in a diagram that summarises the competencies required from personnel at various levels of the SA DOD. Knowledge management is pitched at the executive management level (or SMS) (JDP20: 12). Because of the importance of knowledge as an asset; it would have been reasonable to expect that KM principles and methods will find their way to every level of the SA DOD, not just the SMS-level. It would appear that this is not the case, supporting the view that the SA DOD is not interested in a coherent and integrated KMC. However, some expression on the requirement for KM in the SA DOD does exist within the selected sample of SA DOD Level 1 policy and doctrine, which provides limited evidence that the SA DOD might be interested in adopting KM as a management practice.

DODI43 elaborates on the SA DOD SMS and actually provides a definition of what is perceived as KM, as follows – "Obtains, analyses and promotes the generation and sharing of knowledge and learning in order to enhance the collective knowledge of the organisation" (DODI43: J4-4). This definition is described in the Generic Core Management Criteria and Standards of DODI43 and is very important from the perspective that it identifies an intention of the SA DOD to manage knowledge. When considering the proposed KM definition (dissertation Chapter 2) - KM is the integrated process transforming the organisational intellectual capital into evolving meaning to capacitate understanding, decision-making, action, effect and advantage – the difference is clearly visible.

The DODI43 KM definition is not based on any clear definition in SA DOD policy and doctrine that defines knowledge. The DODI43 definition is also proposing and restricting the SA DOD to a number of processes (albeit a firm starting point). Furthermore, the DODI43 definition does not clearly link KM to enhanced decision, action, effects and advantage – but merely to generate more knowledge and enhance organisational knowledge. So what? The SA DOD does not just generate knowledge it also acquires knowledge. The SA DOD also does not just horde knowledge for the sake of knowing. The SA DOD seeks knowledge to facilitate understanding, enhances decisions, take actions with specific effects in mind and ultimately strive for advantage. The DODI47 definition does not clearly indicate what is regarded as knowledge (e.g. IC). The proposed definition addresses all these issues.

KM is also listed as a Generic Core Management Criteria in Section C (Assessment of Core Management Criteria). DODI43 (J4-4) goes further by stating the following tasks in conjunction with the definition above -

- Manage organisational knowledge with the appropriate information systems.

- Stay abreast of world trends and information by using modern technology.
- Evaluates information from multiple sources.
- Utilise information to influence decisions.
- Create mechanisms for organisational knowledge sharing and associated structures and promote the importance of knowledge sharing within own area of responsibility.
- Enhance organisational efficiency with the use of libraries, researchers, knowledge specialists and other knowledge-bases.
- Adapts and integrates multiple source information to create innovative [KM] solutions.
- Cultivates a knowledge-enabling environment.

These tasks recognise the fact that information is 'more than' knowledge (second last bullet) – thus there is a requirement for KM and not just IM. However, information is distinctly coupled to decision-making. In particular, knowledge sharing and knowledge creation are identified as important KM processes. However, no reference is made to why – i.e. that knowledge enhances actions, effects and advantage. Information management systems are also identified as a key enabler in KM. However, KM is not just achieved with IM systems. Also important is the fact that Senior Management is tasked with KM processes - "… create mechanisms and structures for sharing knowledge…nurtures a knowledge-enabling environment"; but no distinct task to report to an SA DOD KM champion (e.g. a CKO) or to create a KMC. The PFMA (1999) uses the terms "… efficiency, effective and economic" (Sec 38(1)(b)) to describe the management of departmental assets. The only objective that is highlighted amongst the tasks for KM is to "… improve organisational efficiency"; which is very vague because the objectives of militaries are normally linked to specific levels of readiness and certain effects achieved. Mention is also made of 'knowledge-bases' to improve efficiency. This is contrary to the use of the commonly used phrase – 'databases'. Most of the selected sample SA DOD Level 1 policies and doctrine express on the use of databases to manage knowledge continuum artefacts. The attempt by DODI43 to address KM is thus lacking fundamental expressions on at least KM champions, structures, process and objectives. However, of importance is that it tasks SA DOD Senior Management with KM obligations – by implication points to the types of knowledge to be managed in the SA DOD – i.e. per SA DOD staff and line functions. It also confirms that the SA DOD is interested in KM, but did not manage to convert this interest and policy prescript into required action in the DR 2015 and other relevant policy and doctrine which reinforce the perception that the SA DOD only pays lip service to KM.

6.2.1.6 Knowledge Management Enabling Functions

DODI57 alludes to KM enabling functions that would facilitate the following:

> "A [SA DOD] wireless [KM] database in order to increase sharing of [SA DOD] wireless expertise to include information on vulnerability assessments, best practices and procedures for wireless device configurations and connections. … The [KM] database shall be utilised to help determine acceptable uses of wireless devices and employ appropriate mitigating actions. … The [SA DOD] Services and Divisions shall use the [KM] database to coordinate, prioritise, and avoid duplication of vulnerability assessments of wireless devices. ... Information on vulnerability assessments shall be handled in accordance with the security classification allocated." (DODI57: 7-22).

DODI57 only describes a particular type of knowledge to be management by this - "… knowledge database" in various forms such as - "… vulnerability assessments, best practices and procedures". The text also mentions some objectives to be achieved – "… to help determine acceptable uses of wireless devices and employ appropriate mitigating actions" and to - "... coordinate, prioritise, and avoid duplication of vulnerability assessments of wireless devices." (DODI57: 7-22). These are in line with the Senior Management KM tasking as stated above. However, it would seem to be a far cry from being a comprehensive, coherent and integrated approach to KM. The wording also incorporates a considerable amount of construct dissonance. It would have been far more useful to refer to a 'knowledge-base' rather than database because a database has a clear IM link whereas a knowledge-base includes all of the issues raised by the text.

6.2.1.7 Vacuum: Knowledge Operations, Knowledge Warfare Policy and Doctrine

SANDFP3 (6-2 and 3) states that one of the scenarios of a military threat to or attack on the RSA, its citizens and national interests, is - "… action/attack against [RSA] information, information-based processes, and information systems. It includes subjects such as psychological operations, media relations and civil [possibly rather civic] affairs". This is based on "The principles of war for the information age" (see footnote 76). SANDFP3 makes no reference to a scenario that involves knowledge.

If the statement above is based on information era thinking, it then begs the question what the principles of war would be in the knowledge era? This could be an interesting research question for future studies, but outside the scope of this dissertation.

There are several policies and doctrine that elaborate on what is understood by IW and InfoOps. A discussion about InfoOps and other related military concepts follows. IntOps should not be confused with InfoOps (JWP8: 4-25) - "In the SANDF military doctrine, the concept of [InfoOps] is not yet operationalised, and the concept of [IW] is used. [IW], however, is being developed as a capability to enhance the SANDF's war-fighting capability". SANDF military doctrine has not yet operationalised InfoOps as a military concept; still favouring IW as a military concept. There are several policies and doctrine from the selected sample that elaborate on what is understood about IW. JWP1 (5-2) and JWP8 (4C-4, 4C-5 and Def-5) define IW as –

> "… all actions taken to defend the military's information-based-processes, information systems and communication networks; and to destroy, neutralise, or exploit the enemy's similar capabilities within the physical, information and cognitive domains". [IW] consists of six pillars (domains), namely [EW], Network Warfare (NW), [PsyOps], [C2W], Intelligence Based Warfare [IntBW] and Infrastructure Warfare (IIW).".

A very similar explanation is provided by JWP1 -

> "Information in War. The use of information to achieve objectives during a state of war. … Actions taken to defend the military's information-based processes, information systems and communication networks, and to destroy, neutralise or exploit the enemy's similar capabilities within the physical, information and cognitive domains, while protecting one's own". (JWP1: 9-5)

These definitions cluster several military concepts of operation into IW that in fact is much closer to KW (e.g. PsyOps[80], C2W and IntBW). These definitions cluster information-based operations and knowledge-based warfare constructs into IW. It also gives recognition to aspects of RMA, which were stated previously as not having an impact on current warfare. SANDFP3 (2-21) states that IW is a component of InfoOps -

> "This refers to that dimension of the battlespace, which is composed of the electromagnetic spectrum and the non-human sensing dimension in which stealth-masked forces seek refuge from attack. The focus is primarily on the control and manipulation of information. In this dimension vulnerabilities are exploited through electronic means, psychological operations and other measures designed to manipulate, deceive, disable, or destroy an opponent's information systems. The fact is that "weapons of mass disruption" can be a greater danger than "weapons of mass destruction". In [a] Clausewitzian sense, it is characterised by the effort to turn knowledge into capability, the option needed to level the playing field. Unfortunately, being capable of launching attacks of this kind does not always require the presence of advanced technology in the hands of the attacker. This makes the more developed/advanced nation or organisation more susceptible to attacks of this kind by an adversary, such as individuals, terrorist groups, rogue nations or deranged hackers. There is an increasing trend in African governments to introduce intranet-based governmental communication systems using satellite communications, so called [*sic*] E-Governance. Seven Sub-Saharan African countries have introduced such systems since 2000. While enhancing communication and effectiveness, this also increases the vulnerability of these countries to [IW]. These threats will be dynamic, continuous and complex in nature, thus requiring our defence to be able to adapt and change rapidly. It also requires that the [IW] threat should be considered during the development of communication systems to guarantee that sufficient protection and redundancy are built into these systems to ensure protection. Success will no longer be primarily the result of who puts most capital, labour and technology on the battlefield, but who has the best information about the battlefield". (SANDFP3: 11-17)

The construct dissonance is clearly visible; using information and knowledge interchangeably without regard for specific meaning. Information is linked to success (or advantage) and knowledge to 'levelling the playing field'. This is contradictory to knowledge being perceived as the spearhead. The contradiction is thickened by endeavouring to turn knowledge into capability and not information (whilst information is perceived as the advantage driver?) Yet the primary focus is expressed as being information manipulation. Knowledge is targeted for weaponisation, not information. Yet, there is no indication of the knowledge continuum with which to accomplish this. This level of contradiction contributes to possibly misunderstanding the value and use of knowledge vs. information. Figures 6.4a, 6.4b and 6.9 endeavour to illustrate the differences graphically. Advantage on the battlefield is best created or enabled with the best (relevant and near real-time) intelligence (a form of capstone military knowledge), as postulated by Sun Tzu with the wisdom 'know your enemy like you know yourself'. This does not imply being informed (information-based) but knowing (knowledge and possibly wisdom-based). All of this said, specific applications exist for IW concepts, doctrine and techniques. These should be a subset of a much broader warfare paradigm – i.e. Knowledge Operations (KOps) and KW based on knowledge continuum superiority.

[80] See footnote 25 on Effects Based Operations.

SANDFP3 (2-21 - 2-22) states in more detail what consists of, who is primarily responsible, what should be used and certain effects to be achieved –

> "The Government expects the [SA DOD] to concentrate primarily on the [IW] component of [InfoOps]. This would include the offensive and defensive application of the following:
> i. [EW], defined as "The military action involving the use of electromagnetic energy to determine, exploit, reduce or prevent hostile use of the electromagnetic spectrum while retaining its friendly use.".
> ii. [NW], defined as "It is the ability to exploit or use the Information Systems (offensive) or an adversary and to protect all [SA DOD] Information Systems (defensive) to ensure use of own forces.".
> iii. [PsyOps][81], defined as "Planned and coordinated psychological activities, including political, economic and military actions, in peace, military operations other than war, and war directed to an enemy and/or foreign friendly and neutral audiences (internal audiences in exceptional mandated circumstances), in order to influence their emotions, motives, objective reasoning and ultimately, attitudes and behaviour, to secure the achievement of national and military objectives.".
> … It is further expected of the [SA DOD] to become an [IW] centre of excellence and by so doing provide the necessary assistance to [South African National Intelligence Agency] and other government departments in the government's national responsibility of defending South Africa against an information attack. The [SA DOD] must also be in a position to defend South Africa against an information onslaught. It refers to that dimension of the battlespace, which is composed of the electromagnetic spectrum and the non-human sensing dimension in which stealth-masked forces seek refuge from attack, the focus being primarily on the control and manipulation of information. In this dimension vulnerabilities are exploited through electronic means, psychological operations, and other measures designed to manipulate, deceive, disable, or destroy an opponent's information systems as part of hostile actions. The [SA DOD], together with the other government departments, should form a national [InfoOps] Hub and by so doing form a unified organisation to manage National [InfoOps].

The SA DOD is tasked specifically with the following IW focus and boundaries -

> "i. Opportunities and Constraints of the [SA DOD] within the Conduct of [IW -]
> (1) The [SA DOD], in its defensive posture, must ensure that it is combat ready in order to provide defensive IW measures against an information onslaught. These defensive IW measures must concentrate on and protect against a possible enemy outside the borders of South Africa. [these are typical cyber and media threats]
> (2) The [SA DOD] must, however, prepare itself to utilise offensive IW measures against the opponent during an information onslaught. Offensive IW measures will, however, only be used with the authority of the Commander in Chief.
> ii. The Boundaries and Roles for [PsyOps -]
> (1) The [SA DOD] will ensure that all of its fighting forces are protected against a possible opponent/enemy [PsyOps] on and off the battlefield. This protection will be conducted within

[81] Also defined as – "planned psychological activities in peace and war directed at enemy and neutral audiences, create attitudes and behaviour favourable to the achievement of political and military objectives. These operations include psychological action that encompasses those political, military and economic ideological and intelligence activities designed to achieve a desired psychological effect. (JWP1, 9-8)

> [Force Structure Elements] by means of Command Communication, which will be controlled by the [CSANDF] (Corporate Communication).
> (2) Offensive [PsyOps] on the other hand will be restricted to use against the enemy in times of combat. The [SA DOD] must, however, ensure that it has the capability to utilise [PsyOps] as a force multiplier on the battlefield.
> (3) [PsyOps] in the [SA DOD] will always be subservient to the national corporate communications authority with respect to message content". (SANDFP3: 2-22 - 2-23)

Information era perspectives where information is regarded as strategic and an advantage multiplier are clearly visible. This quote separates IW and PsyOps although other statements include PsyOps in IW. It might be just to give more guidance on PsyOps or it might be related to the realisation that PsyOps is not about information and sensors but more about the human mind and much closer to KM than to IM. InfoOps is defined in detail in SANDFP3 (2-20) as –

> "[InfoOps] are joint and coordinated measures in times of peace, crises and war in support of political or military goals that affect or use information and information systems owned by the opponents or other foreign parties… Using own information and information systems, which also simultaneously require protection will provide for this. An important feature to be considered is the influencing of the processing of decisions and decision-making [this factor will be discussed in more detail later in the chapter] … There are both offensive and defensive [InfoOps], which are conducted in conjunction with political, economic and military relations. [other statements use DIME to describe the lines of operation]. Examples of [InfoOps] are [IW], media manipulation, [PsyOps] and [IntOps]. Defensive [InfoOps] are joint and coordinated measures in times of peace, crises and war regarding policy, operations, personnel and technology to protect and defend information, information systems and the ability to undertake rational decision-making…The South African Government recognises its national responsibility to manage [InfoOps]. These [*sic*] it will be conducted by making use of all government departments and centralising the control of [InfoOps] with the [South African National Intelligence Agency] … [InfoOps] are conducted at national level. Government is responsible for directing the specific government departments. The effective coordination of the effort to obtain the ultimate goal, viz "Achieving Information Superiority" must be the total focus when contributing to [InfoOps]. [InfoOps] will be used to attempt a number of different capabilities (within the national sphere) such as perception management (psychological operations), deception, computer network attack and electronic warfare, to shape and influence the information environment.".

This quote separates IW, PsyOps and IntOps, contradicting other statements. The primary goal is information superiority, which is an information era construct. Knowledge superiority should be the focus. This manner of thinking might also be due to the use of POSTEDFILT(B) and C^4I^3SR constructs rather than (as proposed by the researcher) POSTEFKTB and C^4IKRS. This will assist the commander in knowing his enemy like he knows himself, not just being informed about his enemy. JWP1 (5-2) defines SA DOD InfoOps and IW as follows –

> "[InfoOps]..." a wide range of military and government activities to protect and/or exploit designated information domains in support of specified initiatives" [also found in JWP8 (Def-5)]. [InfoOps] targets mainly the adversary decision-maker "To affect the adversary decision-maker [InfoOps] will attempt to use a number of different capabilities (within the national sphere) such

as perception management, deception, computer network attack and [EW], to shape and influence the information environment". (Also JWP8: 4C-4 and 5 and SANDFP3: 2-21)

"[IW], however, is being developed as a capability to enhance the SANDF's war-fighting capability. [IW] is defined as: "all actions taken to defend the military's information-based-processes, information systems and communication networks; and to destroy, neutralise, or exploit the enemy's similar capabilities within the physical, information and cognitive domains". [IW] consists of six pillars (domains), namely [EW], [NW], [PsyOps], [C2W], [IntBW] and [IIW].". Also, "Although [IW], and specifically PsyOps, as well as Corp Com all support the communication and the information campaign of government and are therefore related, they are clearly separate entities and activities. Each is performed according to its own principles and standards while supporting the mission and overall political and military objectives.".

Yet, InfoOps is described in other statements already mentioned as incorporating knowledge related warfare. And then there is the consistent linkage of information to decision-making and action without the mention of knowledge. JWP8 (4-25) states about InfoOps –

"[InfoOps] (including [PsyOps]), as well as the separate but related activity of Corporate Communication, are directed at the State's population at large and at neighbouring states which share borders in the sub-region; indirectly [InfoOps] are aimed at the military contingents and civilian agencies that comprise the overall peace mission. The audience targeted by [InfoOps] and Corporate Communication may widen to include states at a greater geographical distance that share ethnic or cultural roots with the affected state, and the international community – notably those countries that are contributing military forces and other resources to the peace mission".

JWP8 (4C-4 and 5) describes the relationship and activities of SA DOD corporate communications with [InfoOps] and [IW] in PSOs as close -

"Although [InfoOps], and specifically [PsyOps], as well as Corporate Communication, all support the communication and the Information Campaigns of national governments, and are therefore inextricably linked, they are clearly separate entities and activities. Each must be performed according to its own principles and standards while supporting the mission and overall political and military objectives.".

Thus, InfoOps is positioned to have a high-level strategic impact. All the more reason to incorporate InfoOps and all its elements into a construct such as KW that would seek to use the entire knowledge continuum as a weapon for deterrence, defence and offence.

The information era thinking is clearly visible in the quotes thus far. The "information onslaught" was also mentioned earlier in this chapter of the dissertation as a driver of information era related thinking and operational requirements. That information onslaught has probably mutated into a 'knowledge onslaught' in order to gain an advantage based on knowledge artefacts stemming from the knowledge continuum (e.g. intelligence and IP). The fact should not be disregarded that there is and probably will be, into infinity, an information overload or saturation. This is a separate issue from IW (clearly defined above). A key objective is raised as gaining or having information superiority which stems from information being perceived as being strategic. No mention is made of the requirement for knowledge superiority. No mention is made of the

probability of KW that is based on knowledge superiority and its impact on decision-makers, actions, effects and advantage. There seems to be an SA DOD Level 1 policy and doctrine gap on these matters. This gap probably stems from construct dissonance and the fact that the SA DOD has not formally recognised the international transition to the knowledge era, neither has the SA DOD formally entered the knowledge era. This also impacts another doctrinal statement 'we fight as we train'. If the SA DOD's training is based on information era constructs then the 'fighting' will also be based on information era constructs. The result is that the SA DOD will train for the previous war. Taking a more practical view on IW in unique and complex PSO environments -

> "Efficient co-ordination of the use of all available military capabilities to protect the [Peace Support Force]'s [C2] in support of the mission will be a high concern. C2 protection is vital to overall force protection and should incorporate an [operational security] policy that specifically considers vulnerabilities in the [Peace Support Force]'s communications and information systems as well as other [operational security] areas. An analysis of the parties subject to the PSO is invaluable to assigning military intelligence priorities and the prioritised use of EW and other specialist resources to support the mission. Continual analysis of hostile parties' media resources is important to ensure their objectivity and that they are not used as a C2 means to incite violence and opposition to the mission. In certain circumstances, the use of deception or physical destruction may be appropriate to deceive or destroy a hostile party's C2 capability. In addition, EW assets may have to be used to secure friendly forces use of the electromagnetic spectrum, and to deny its use by hostile parties. Information planning and activity forms [*sic*] an integral element of deep operations within the [Peace Support Force] Campaign Plan". (JWP8: 4-26)

This quote provides a glimpse at the level of integration required to secure C2 in PSO. This is no different for military operations not classified as PSOs. The level of complexity cannot be overstated. Yet, the level of coherence and integration required is fairly understated. The requirement for security of information is significantly underlined. Knowledge security is thus implied based on the significant amount of construct dissonance identified thus far in the selected sample of SA DOD.

SANDFP3 (10-1) states - "Opponents will seek to contest technological advantages of armed forces through [IW] and asymmetric techniques.". This should not be problematic if the SA DOD uses KW as a deterrence, defence or offence.

JWP8 (5B-1) states the following about information and C2 –

> "The information and data essential to effective logistic planning are much less readily transferred between nations with disparate doctrine and different Management Information Systems (MIS). Some nations may not be willing to divulge information, even to allies, and the absence of, and incompatibility of MIS within the African Union and Southern African Development Community will undoubtedly hamper the sharing of information".

Command and control are critical to advantage and required for any military operation. Again only data, information and information systems are stated as critical enablers to C2 (although it is stated within the specific context of logistics planning). Doctrine is stated to have a critical impact on data and information sharing. It will possibly have the same effect on other capstone knowledge sharing, thus hinting at a KM doctrine to inform this process and to facilitate coherence and

integration of the knowledge continuum, both within the SA DOD as well as between the SA DOD and international partners.

JWP8 (Def-5) defines information campaigns within the context of PSOs as follows – "Co-ordinated information output of all Government activity undertaken to influence decision-makers in support of policy objectives, while protecting one's own decision-makers". Again the notion is that information is the decision-making enabler as opposed to knowledge (i.e. intelligence).

JWP8 (2-1, 3-2 and 3-8) makes mention of the use of campaign InfoOps, which will be inclusive of InfoOps and public information strategy in PSOs. This is typically IntOps alternatively labelled due to the sensitivity of the use of IntOps within the context of PSOs. This sensitivity is summarised as follows –

> "The parties to a conflict, and even some Mission elements may perceive the gathering of intelligence as a hostile and sinister action. It is for this reason that UN led [*sic*] operations deliberately replace the term military intelligence with 'military information'. To ensure no misunderstanding within the context of the SANDF for which this JWP is intended, the term 'intelligence' must be maintained. 'Intelligence Integrity' must be established and maintained; this involves the physical management and conduct of [IntOps]". (JWP8: 4-10)

JWP8 (5-23) states about SA DOD Special Forces and information in PSOs –

> "[SA DOD Special Forces] conduct covert surveillance and reconnaissance by land or sea in a static or mobile role. They can provide timely information to political and military decision-makers and commanders. This contributes to the overall intelligence picture and may provide collateral for information from other intelligence, surveillance and reconnaissance systems, be used to cue such systems to confirm technical intelligence or to trigger interdiction. [SA DOD Special Forces] may provide a more appropriate means of obtaining information due to hostile terrain or climate and by developing information from human contact. Where ambiguity exists [SA DOD Special Forces] can provide 'ground truth'.".

This text relates information to being a contributor to intelligence, decision-making and action, which is probably correct. It also equates information to 'ground truth'. The importance of having information should thus not be underestimated in the process of knowledge generation. There is, however, risk in basing decisions and actions purely on information. 'Ground truth' within the context stated is probably closer to knowledge than information when considering one of the first definitions of knowledge stated in the literature review (dissertation Chapter 2) as being 'justified true belief". Ground truth should also be defined as this is not a military term. Real-time or near real-time intelligence is a more recognised term. Intelligence is used in this construct because it is closer to being 'true' from a process perspective.

IntOps (including surveillance and reconnaissance) are clear sub-sets of the proposed broader KOps and KW constructs. IntOps are based on capstone military knowledge (intelligence) and techniques which is employed to 'know the enemy' and are thus clearly linked to principles of war. Information Warfare more than often provides data and information to IntOps operatives and processes. It is thus a complex system that requires multi-layered and joint action based on coherent and integrated management as well as excellence in C2. This can hardly be achieved with

only IM. The USA military understands this and therefore embarked on the journey towards knowledge superiority through KM, a decade ago already.

6.2.1.8 Construct Dissonance

Construct dissonance, about data, information and knowledge, is wide-spread throughout the selected sample of SA DOD Level 1 policy and doctrine. Several examples have already been highlighted and discussed thus far. Construct dissonance seems to be a primary contributing factor to the SA DOD entrenchment in the information era, consequently resulting in the perception that the SA DOD is not interested in KM. The contradictory use by the SA DOD of the named constructs highlights the poor understanding of the constructs and their respective value and use in terms of decision-making, action, effects and the creation and sustainment of advantage. This predicament was also graphically illustrated in Figure 3.18 at the end of Chapter 3 of the dissertation.

For the SA DOD, coherence can only be achieved if the various constructs are appropriately defined in an authoritative SA DOD taxonomy, as the first step towards meaning and understanding. This should be a priority of a future SA DOD KMC. Because there is synergy between the proposed definitions of this dissertation, relationships displayed in Figure 3.17 also holds true for knowledge. A focussed view of the proposed knowledge continuum (Figure 3.16) and the proposed KM definition (Figure 3.13) is provided in Chapter 3 of the dissertation.

Thus, whereas the ideal picture would be based on the approach above in Figure 3.17; currently in the SA DOD data may be used mistakenly as information and/or knowledge and information is equated to various types of military knowledge – and vice a versa. This predicament is probably negatively affecting the quality of decisions, action, effects and possibly eroding advantage. The graphic clearly shows that 'all roads lead to' information – reinforcing the SA DOD perception based on its Level 1 policy and doctrine that information is strategic and should be managed as such. The graphic above was extrapolated and supported by the tabulated information below.

Table 6.2: Evidence of the Construct Dissonance found within the Selected Sample of SA DOD Level 1 Policy and Doctrine within the Context of this Dissertation

Factors Impacting Perceived Dissonance	Source
Distinguish between wisdom and knowledge	JDP13 (A-3) and JDP4 (B-5)
Distinguish between skill/know-how/expertise and knowledge	DODERF1 (B-4) DODD18 (3), DODI1 (various pages), DODI10 (1), DODI14 (2,3), DODI26 (13, B10), DODI25 (20), DODI27 (D-1), DODI28 (10 and A-2), DODI30 (4-7), JDP19 (4), JDP15 (A-2, A-5), JDP16 (A-3, A-6, A-7), DODI40 (15, M9-1), DODI42 (17), DODI49 (1), DODI43 (ix, N-1, N-4, N-7, N-10, N-13), DODI45 (14), DODI61 (3, 5, 12, 22), JDP13 (3,7,8,11, A-1, A-2, A-3), JDP14 (2, 3, 4, 5, 9, 10, 11, 13, 16, A-1, A-2, A-5, D-4), JDP1 (8-1, 8-7), DODI56 (2, 3, 7, 8, 13, A-1, A-5, A-6, I-1, I-2, I-5), JDP10 (2), JDP15 (A-2, A-5), JDP20 (3, 4, 5, 10), JDP3 (3-2, D-4, H-6), JDP4 (B-4, D-3, D1-8, D1-9, D5 para 79, 126, E1-7, E1-12), JDP6 (2, A-2), JDP9 (10), JWP4 (4-6, 5-5),

Factors Impacting Perceived Dissonance	Source
	SANDFO2 (B-1-4, B-1-5) and SANDFP3 (xiv, xviii, 8-1, 9-3, 13-3, 15-9, 15-14)
Distinguish between experience and knowledge	DODI14 (3), DODI27 (D-1), DODI30 (4-7), JDP16 (A-6), DODI40 (33, 49, 50), JDP13 (A-2), JDP14 (4), JDP1 (4-5), DODI56 (2, 3, 7, 8, I-2), JDP3 (D-10, D-12), JDP4 (D1-8), JWM1 (viii), JWP1 (1-2, 2-2, 2-4, 9-5) and JWP8 (6C-6) Several academics are of the opinion that knowledge is in fact particular skills sets (e.g. T-shaped skills).
Distinguish between understanding and knowledge	JDP13 (A-1), JDP14 (A-1, A-2, D-4), DODI56 (13, A-1, A-6), JDP20 (3, 4, 5, 10), JDP4 (D3-2), JWP1 (1-2, 6-5) and JWP8 (3A-20, 4C-1, 6-1) KMI is of the opinion that knowledge is understanding gained through various knowledge processes
Knowledge and skill is part of competence	DODI26 (B10), DODI27 (D-1), JDP4 (D1-9) and JDP9 (2)
Distinguish between knowledge, skills and competence	DODI43 (N-1, N-4, N-7, N-10, N-13), JDP14 (6, 11), JDP4 (D1-8) and SANDFP3 (xviii) There are academics that is of the opinion that knowledge is general competence
Knowledge is inherent in experience	JDP14 (9)
Distinguish between knowledge and information	DODI1 (9A-6), JDP13 (A-2), DODI56 (A-6), JDP4 (D2-5, D5-2), JDP9 (8), SANDFP4 (L-1) and DODI61 (B-3)
Equates data with knowledge	DODI23 (A-2)
Equates information with knowledge	SANDFP4 (L-1), DODI26 (17) and JDP9 (D-5)
Equates doctrine with knowledge	DODI1 (1A-6)
Equates doctrine with information	DODI50 (11) and JWP8 (1-6),
Distinguish between doctrine and information	DODI1 (1A-3)
Distinguish between doctrine and policy	SANDFP2 (1)
Distinguish between doctrine and procedures	SANDFP2 (1)
Distinguish between IP and information	DOD23 (43, A-3)
Uses knowledge and IP in the same context	DOD23 (26)
Distinguish between data and information	DODERMF1 (5-3, 6-1, B-5, B-6), DODI1, DODI23, DODI24 (B-4), DODI26 (24), DODI30 (3-10), DODI39 (A-2), DOD42 (J-19), DODI50 (13), DODI57 (1-7, 1-8, 1-9, 7, B-3), DODI60 (5, 10), IDODI2 (14), JDP16 (C-1), JDP3 (D-8, D-9), JDP4 (Appendix E), JDP9 (10), JWP1 (2-12), JWP8 (5-15, 5B-1) and SANDFP3 (4-3)
Equates data with information	DODI23 (A-1), DODI24 (24, 35), DODI42 (A-6), DODI61 (A-1) and SANDFP4 (L-1)
Distinguish between data, information, policy, doctrine and knowledge	JDP16 (C-1)
Separates intelligence from data	SANDFP3 (4-3)

Factors Impacting Perceived Dissonance	Source
Equates intelligence with data	JWP8 (15, 16)
Equates intelligence with information	DODI1 (7A-4) and DODI26 (17),
Distinguish between intelligence and information	DODSPF1 (18) , DODI26 (17), DODISPF1 (17-18), JWM1 (2-4), JWP4 (3-2), JWP8 (4-10, 4C-4, 6B-5) and JWP1 (1-6, 1-8)
Distinguish between knowledge and resources	JDP1 (5C-1) This is problematic for the SA DOD when knowledge is not perceived as a resource. In fact, from the discussion in the literature review, knowledge is perceived by business organisations that seek competitive advantage as a strategic resource
Distinguish between knowledge and insight	JDP1 (5C-2), JDP12 (A-3), JDP3 (3-2), JDP4 (B-5) and JWP1 (1-2) In the researcher's opinion, to have insight is to have knowledge

In order to supplement this tabulated construct dissonance position, a number of quotes from the selected sample of SA DOD Level 1 policy and doctrine and comments are provided because the reader might not have access to SA DOD Level 1 policy and doctrine documents. The researcher did not reintegrate any discussion or quote, thus far in Chapter 6 of the dissertation, on construct dissonance. The following definitions strengthen the perception of construct dissonance which contributes to the SA DOD's lack of awareness of the requirement for coherent and integrated KM. Let us first consider some statements and definitions from the selected sample of SA DOD Level 1 policy and doctrine.

DODI57 (B-3) defines data as - "… a graphic or textual representation of facts, concepts, numbers, letters, symbols, or instructions suitable for communication, interpretation, or processing. Data is the basic element of information that is used to describe objects, ideas, conditions or situations.". IDODI2 (14 and 15) acknowledges that data is transformed into information. DODERFM1 (A-5) states that data is included in information as a construct. These statements are the closest to the academic interpretation of the construct as discussed in the literature review (dissertation Chapter 2) and supported by the researcher of the dissertation.

There are a number of definitions and statements that equates data to information and information to knowledge, contributing to probably the incoherent use and application of these constructs. DODI28 (A-1) and DODI61 (A-1) define consultant data as – "… recorded information, regardless of medium or characteristics, of any nature, including administrative, managerial, financial and technical. (Mil-Std-973)". This definition reflects a statement from a Military Standard, which should be an authoritative expression on definitions and concepts.

DODI50 (13) perpetuates the confusing use of the data and information as constructs - "Detailed information on the performance, capabilities, technical specifications and serviceability of Defence equipment provided that such data is not already generally publicly available". This is probably not data but rather information or knowledge.

DODI28 (15) makes reference to "... raw data" and "… analysed data". Analysed data is nothing other than information and raw data is data. This typology used in DODI28 is not helpful to the SA DOD to distinguish between data and information if not defined with care. JDP9 (14 and D-5) defines metadata as -

> "… data describing context, content and structure of records and their management through time… descriptive data that gives context to documents. Without the necessary descriptive metadata attached a document cannot be considered to be a record. Descriptive metadata gives information about where a document comes from, who the creator was, when it was created, where it is located".

This quote confirms that the SA DOD recognises data and information as separate constructs, and reflects on the granularity of data. Metadata is typically found in the area of overlap between data and information based on the opinion that metadata is data with contextual elements attached to it. JDP16 (C-1) also separates data, information, policy, doctrine and knowledge within its Education, Training and Evaluation value chain.

DODI1 (7B-11) makes mention of metadata that enable searching for information in a database. The existence of metadata is thus very important for the accessibility of information and knowledge. The definition also confirms the important elements for the construction of military knowledge (who, what, where, when, how, which effects and what thereafter) as discussed in Chapters 2 and 3 of the dissertation. Individually these elements probably represent data; in combinations, they probably represent information – combined all together they probably represent knowledge. DODI60 (9) provides another example where data and information is used interchangeably -

> "Print documentation containing information about the receipt of the message when required for record keeping purposes, and attach it to the message. The transmission data identifies the sender and the recipient(s) [who], as well as the date and time [when] that the message was sent and/or received [when]. This data provides the essential context for the message. This is equivalent to correspondence on paper, where the record includes information identifying the sender and recipient, as well as the date of the letter and not just the message.".

In both cases (electronic and paper correspondence) the identity of the sender and/or receiver (who) is probably data as well as the times involved (when). When read with the message (what, where, when, how, which effects and what thereafter) it becomes information and read together with the entire conversation between the parties involved might be regarded as knowledge. These issues illustrate the diminishing granularity of the knowledge continuum as the density of information and other knowledge increase. This concept is illustrated in Figure 6.4b along with its importance to the OODA loop. DODI23 (A-2) defines a "data item" as -

> "… a contractually deliverable information document, including, but not limited to a plan, a specification, an analysis, a study, a standard, a design, a drawing, a model, an algorithm, computer software, a process document, a design report, a technology report, a test and evaluation report, and a qualification report;" Also, "data packs" means logically grouped collections of data items;"

Probably all the above proposed "data items" are knowledge closely associated with what the SA DOD considers to be IP, (or at the very least information). Considering the definition of defence IP in DODI23 (A-4) -

> "defence foreground IP" means any IP that is created exclusively with or partially by defence funds, and may be found in, or take the form of patents, copy right [*sic*], trademarks, trade secrets, books, manuscripts, reports and notes, computer software, inventions, drawings and designs, data items, data packs, specifications, models, photographs, and other graphical images…".

JDP3 (D-8) states within the context of ETD that - "A learning unit has identifying data such as the title of the subject/module, the topic of the learning unit and maybe even a number for the unit.". This supports the view that data has very coarse granularity (i.e. describing elements such as who, what, where, when, how, which effects and what thereafter) compared to information and knowledge as mentioned earlier.

DODI1 (7B-3) states - "Collect and Prepare the Data (Including Benchmarking). This involves the collection of information according to the research design in order to gather all relevant information pertaining to research question – including "benchmarking".". The description does not refer to data collection, leaving the reader of the policy to ponder whether data and information might be the same thing. DODI26 (A-3) defines a repository as –

> "… a centralised store (integrated holding area) for information about modelled artefacts (strategy, processes, and the events that trigger them to represent the approach in satisfying customer requirements - It attempts to show how business is to be done). A database that is structured according to a framework, which provides a central store to hold all baselined architectures".

Thus, a repository is essentially a database. The SA DOD manages several of these (see the discussion on types of knowledge later in this chapter). The quote above equates modelled artefacts to strategy and processes. From the literature review and military KM (Chapters 2 and 3), it became clear that strategy and processes constitute a form of military knowledge. Therefore, by labelling SA DOD military knowledge (such as strategy and processes) as 'modelled artefacts' it will only serve to broaden the conceptual dissonance. These are knowledge artefacts. DODI61 (A-1) defines the consultant database as –

> "… the collection of data in a form capable of being processed. The consultant database refers to recorded information, regardless of medium or characteristics, of any nature, including administrative, managerial, financial and technical and shall be divided into various categories, where each category represents the type of specialist service/advice.".

DODI28 (A-1) defines a database as - "…a collection of data in a form capable of being processed. (Mil-Std-973).". DODI61 (A-1) defines the consultant database as –

> "… the collection of data in a form capable of being processed. The consultant database refers to recorded information, regardless of medium or characteristics, of any nature, including administrative, managerial, financial and technical and shall be divided into various categories, where each category represents the type of specialist service/advice.".

This compounds the problem of understanding what SA DOD databases actually contain – data, information, knowledge or all three. It clearly requires separation into different types of bases in order to improve decision-making. The SA DOD tends to classify all repositories as databases instead of making a distinction (i.e. database, information-base and knowledge-base) in order to provide more structure and coherence and to enable aggregation and integration in a more systematic manner. Because of possible misunderstandings of the various constructs, the SA DOD attempts to manage all the constructs as information within databases with IM processes and practices. This is information era thinking. This will lead to a deterioration of advantage over time. This opinion is eloquently illustrated with quotes from DODI1 (1A-4 and 6A-2) and DODI39 (10 and A-2) stating information can be stored and accessed from a database and with a quote from DODI1 (6B-3) stating the following -

> "Update and Maintain the Information Centre Digital Repository. The information database comprises written products, photos and short videos. It is an electronic database of questions and answers that is to be continually updated and maintained in order to have updated and maintained information available on a continuous basis".

This maintenance requirement is also stated by DODI22 (4) - "… maintenance of data integrity of the organisation life cycle information systems is provided for". These maintenance issues are related to knowledge continuum security.

DODI1 (7C-25) states – "Obtain Knowledge of Stakeholders Visiting Official DOD Websites [*sic*] (Determine Virtual Stakeholders). Determining of data concerning the visitors to DOD websites ensures valuable knowledge of stakeholders, which will result in satisfying the information needs of stakeholders". The quote recognises the different constructs but fails to structure the statement in such a manner consistent with the proposed knowledge continuum. This leaves the policy reader to believe that if he/she has data they have knowledge. The use of knowledge in the sentence is not well considered. Also, stakeholders will be interested in knowing (or knowledge) more than just information. This type of misconception and the construct dissonance discussed above could be mitigated with the establishment of a detailed authoritative taxonomy of the knowledge continuum artefacts.

Perpetuating construct dissonance, DODI28 (2, 15 and 19) states the importance of data to ergonomics management - "[DODI28] must provide for an adequate and sustainable knowledge-base to access ergonomics information and databases on a continuous basis … The ARMSCOR Institute ERGOTECH, is responsible to establish and manage an ergonomics knowledge-base in the form of ergonomics literature (journals, text books [sic]) and computerised research reports". These statements make the distinct connection between data, information, knowledge, databases and knowledge-bases. The 'knowledge-base' referred to is probably the employees and the database the repository for knowledge continuum artefacts and probably computer-based. This confirms that the SA DOD manages or is at least interested in knowledge-base management and that (from the above) there are knowledge-, information- and databases in the SA DOD (or managed for the SA DOD).

DODI28 (8) states that the SA DOD ergonomics database is a strategic asset because it contains – "… subject specific [IP], knowledge, research information, strategic personnel and job profiles, Defence ergonomics best practices and analysed operational data. Specific RSA Defence

ergonomics information (RSA-Mil-Documents) is available on the ARMSCOR website at http//armscor.co.za.". This database thus contains probably mostly information (e.g. research information, analysed operational data) and knowledge (e.g. intellectual property, knowledge, best practices). However, all of this is found in a database, supporting the conception of the researcher that there should be differentiation.

The storage of knowledge continuum artefacts on a database is commonplace in militaries and businesses. This legacy practice might be one of the contributing factors to construct dissonance. It would be more appropriate to store data on a database, information in an information-base and knowledge in a knowledge-base; and then have software and other methods that integrate the content to such an extent that the user can find relevant data and/or information and/or knowledge on a particular subject. Quality decisions typically require knowledge whereas research would require the entire continuum. Because there is no agreement on knowledge ontology, all is just dumped in a database. From a strategic asset management perspective or a resource-based view of the organisation - it is a bit like storing and managing fighter aircraft with the rest of the inventory and spares in a general logistics store or warehouse because there is no purpose-built storage facility for the fighter aircraft. Thus, the absence of purpose-built SA DOD knowledge storage facilities and management system/capability will result in the knowledge being stored in general databases with data and information and managed with data- and IM processes. These issues support a requirement for different types of repositories to be properly defined and integrated. This practice contributes to construct dissonance and management paralysis within organisations such as the SA DOD because of the interchanged use of already very contention constructs. An SA DOD KMC is proposed to cross these hurdles with.

DODI24 (16 and C-3) states that the Software Asset Manager is responsible for data management of software and related assets. This confirms that the SA DOD does engage in data management; also mentioned in JDP9 (D-6). There is thus no reason for confusing data management with IM.

With insight into what the SA DOD regards as data and databases; let us discuss policy expression, from the selected sample of SA DOD policy and doctrine, on information as a construct. Information is regarded as - "Any recorded or displayed data or knowledge or communication content, regardless of its format" (JDP9: D-5, SANDFP4: L-1 and DODI57: B-7). JDP9 was ratified as early as 2008, roughly at the beginning of the process to draft the DR 2015. Possibly a more detailed definition is -

> "Information is any recorded or representation of knowledge or communication content, regardless of its format concerning objects such as facts, events, things, processes, ideas or opinions that has [*sic*] a particular meaning within a certain context (adapted from: Reference A: ICT Strategy)" DODI39 (A2).

The word knowledge in this definition should have been data, bringing the definition closer to the opinions in literature – i.e. information is data within context. Another version of this definition is - "… any recorded or displayed data or knowledge or communication content, regardless of its format." (SANDFP4: L-1 and DODI57: B-7).

The construct dissonance in these definitions is clear. What is not clear is the meaning of 'communication content' in the quotes above? Does this refer to something other than data, information or knowledge? This requires a detailed descriptive taxonomy. Other definitions are - "Information can include historical data, theoretical analysis, informed opinions, and the concerns of stakeholders". (DODI42: A-6 and DODERMF1: A-5) Also "Information is any knowledge, which can be transmitted by means of any method, whether by way of word of mouth or by way of a document or materiel [*sic*], irrespective of how it was originally obtained. (Source: Military Dictionary)" (DODI30: A-2)

The Military Dictionary is referenced as the source in DODI30 (A-2). This dictionary definition encapsulates the entire problem – information is equated to knowledge. The Military Dictionary (also a document available in the SA DOD policy database (pp_static dated 17 May 2016), but not part of the sample due to the age of the document) – was consulted by the researcher to verify the definition. The following was found -

> "information : informasie
>
> 1 Any knowledge which can be transmitted by means of any method, whether by word of mouth or by way of a document or material, irrespective of how it was originally obtained
>
> 2 Unevaluated material of every description, including material derived from observations, reports, rumours, photographs and other sources, which, when analysed, produces intelligence." (Military Dictionary, 185-186).

The first part of the definition actually refers to the fact that information needs to be made explicit to be regarded as information. The fact that it is labelled 'knowledge' is unfortunate and possibly due to a poor understanding of the construct at the time of publishing. The second part of the definition in the Military Dictionary was not included in DODI30. The second part of the definition alludes to 'intelligence' as a product of analysed information and possibly data that is labelled 'unevaluated material'. This brings the researcher back to the first part of the definition; which could have substituted the word 'knowledge' for 'evaluated material'. Thus, not only is the construct of knowledge included in information but also data ("unevaluated material of every description") and intelligence.

DODI30 also fails to provide a definition for intelligence as a construct. DODI30, aiming at (amongst others) information security (which apparently also include knowledge security), is silent on intelligence security. This is possibly a result of the inclusive approach to the information as a construct – i.e. information = data, knowledge and intelligence.

JWP8 (Def-5) defines information as - "… data collected from the environment, processed and put into context. (JWP 101 Operational Art)". This is probably the closest definition to that of definitions and perceptions found in academic literature as discussed in the literature review. The researcher supports the JWP8 definition based on the literature review of the dissertation.

Also supported by the researcher of the dissertation, acknowledging the differences between data, information and knowledge, DODI39 (A2) defines content as -

> "… all the data, information and knowledge contained in a record. Content is the essential matter or substance of a record, as opposed to its form or style. In a more general sense, content reflects all the ideas, topics, facts, or statements contained in a record.".

In contrast, DODD4 wants the reader to believe that records only contain information and not necessarily data and/or knowledge. JDP9 (1 and 3) and DODD4 (1) define a record as information – "Records are information created, received, maintained and used as evidence and information by an organisation in the pursuance of legal obligations or in the transaction of business" JDP9 (1 and 3) adds to this – "… Well-managed records are a vital part of the DOD's information resources. Appropriate management of records is a vital aspect of maintaining and enhancing the value of this asset". This statement is most likely based on the perception that information is data and knowledge as expressed in the definitions of information above. It also reflects the SA DOD's understanding that records management is tantamount to IM and because information is regarded as the strategic asset of choice (and not knowledge) and that IM is the management model choice. As stated earlier by the researcher; well-managed information generally does not increase in value, but rather diminishes. Information management just assures the availability of information over an extended period of time. JDP9 (6) states the requirement for "direct knowledge" for a record to be considered reliable –

> "A reliable record is one whose contents can be trusted as a full and accurate representation of the transactions, activities or facts to which they attest and can be depended upon in the course of subsequent transactions or activities. Records should be created at the time of the transaction or incident to which they relate, or soon afterwards, by individuals who have direct knowledge of the facts or by instruments routinely used within the business to conduct the transaction.".

There is no definition of 'direct knowledge' provided, thus making the statement ambiguous and open to interpretation. It does articulate the importance of knowledge in the process of assembling reliable records for the SA DOD – records being one of the primary methods managing the SA DOD organisational memory. Organisational memory is important for decisions, action, effect and advantage, thus linking knowledge (not information) to decisions, action, effect and advantage. These records need to be reliable, accurate and useful. It begs the question, however, if records that just contain data and information are not regarded as reliable? If this is the case, then how can the SA DOD regard information as strategic? This type of logic is the result of the extent of construct dissonance within the selected sample of SA DOD Level 1 policy and doctrine.

An intention is stated in JDP9 (8) to provide for organisational memory development and maintenance, however, not based on knowledge but on "accurate and up-to-date information" -

> "Corporate records thus form the stable core of [IM] – reliable, accurate, quality information – taking in records from day-to-day operational systems, extracting and summarising to knowledge-based and briefing systems (and capturing the result), and publishing in different formats to websites, Intranets, publication schema, asset registers. Well-managed records and archives are a vital part of the [SA DOD]'s information resources and must be managed within a wider information management system to guarantee accurate and up-to-date information, controlled versions, and sustainable corporate memory.".

This is indicative of the fact that the SA DOD has not made the shift to the knowledge era and also has not made up its corporate mind about what information is and what constitutes knowledge

and their relative uses and values. This statement clearly calls for IM and not KM, with a brief introduction of knowledge-based systems, which is not clearly defined as to its purpose and method as well as corporate memory (which will include data, information and knowledge). KM is thus a requirement albeit not clearly stated and confused with IM. Important though is the mention of knowledge-based systems. These seem to support the notion of differentiating between databases, information-bases and knowledge-bases. The complexity and contemplation of such a separation are outside the scope of this dissertation but would make for interesting future research.

JWP8 (4-10) states that background information can be obtained from libraries, the media, satellites, etc. Based on the definitions of SA DOD information it is to be understood, probably incorrectly, that information in this context includes knowledge. Libraries probably contain more knowledge than just information.

Central to the problem of construct dissonance is the fact that there is no definition of the knowledge in the selected sample of SA DOD Level 1 policy and doctrine. Knowledge is included in the definitions of information as being part of information. There are only descriptions of function-specific knowledge found in some policies. DODI1 identifies a number of specific types of knowledge associated with the SA DOD Corporate Communications environment. These are:

> "Applied Knowledge. … the application of existing Corp Com knowledge in the work place [*sic*]. It incorporates practical skills, i.e. Creative writing skills, associated with the Corp Com occupational responsibility of each of the occupational tasks identified (the tasks to deliver Corp Com products).". (DODI1: 1A-1) This is typically Human IC.
>
> "Contextual Work Place Knowledge. … relates to the specific knowledge that can only be obtained in the work place [*sic*]. This includes knowledge of specific strategies, brands, products, protocols and procedures. This knowledge is only provided by the work place [*sic*].". (DODI1: 1A-4) This is typically Structural IC.
>
> "Functional Knowledge. … the technical expertise and knowledge required for a Corp Com functionary to perform the prescribed functions of the post within the framework of the scope of practice and standards as required by the relevant area of responsibility.". (DODI1: 1A-10, IDODI1: A-3 and JWP1 (9-5) This is typically Human IC.
>
> "Knowledge Component. … comprises various subject specifications. Knowledge refers to discipline or conceptual knowledge (including theory) from a recognised disciplinary field found on subject classifications systems.". (DODI1: 1A-12). This is typically Structural IC.
>
> "Knowledge Focus Areas. … the conceptual knowledge/theory and information required to produce the product or services identified.". (DODI1: 1A-10) This is typically Structural IC.

The knowledge constructs mentioned above are a requirement for the entire scope of the SA DOD. All of these are very closely related and in some cases possibly overlapping. They closely conform to the construct of IC discussed in Chapter 2 of the dissertation. No mention is made of relational IC. They do not offer a concise definition of SA DOD knowledge. The word 'knowledge' is also used in the description which is not useful when describing what it is. Some descriptions equate knowledge to discipline, conceptual- and theoretical knowledge, but still, do not define knowledge as a construct leaving the space open for every functionary to define knowledge as required. The definition of learning component in DODI1 (1A-10) – "The learning component consists of conceptual knowledge/theory and information, practical/applied knowledge and skills

and work experience", illustrate these issues clearly. If the SA DOD understands information to be inclusive of knowledge and knowledge (according to literature are inclusive of skills and experience) then the definition should be much shorter. However, the definition separates all these constructs letting the reader believe that they are different with clear boundaries.

DODI26 (17) provides another clear example of the dissonance within the SA DOD about what knowledge and information in the following quote are – "Business process modelling captures fundamental enterprise business knowledge and displays this information graphically.". In the same paragraph, it is stated that business intelligence is important to achieve this. In DODI26 (17 and 18) the following is stated about business analysis – "This activity involves the gathering and analysing of information to obtain an in-depth understanding of the business area, its goals and objectives, directions and priorities. This knowledge enables the creation of a business model…". This statement actually acknowledges the symbiotic relationships between processed information, understanding and new meaning (or knowledge). This statement recognises the importance of understanding in the knowledge generation process. It also recognises the importance of knowledge as the enabler to business model creation. This is a contradiction to the perception of the SA DOD perpetuated by SA DOD Level 1 policy that information includes knowledge.

DODI42 (2, C2-2) states about risk within the context of risk management – "Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of an event, its consequence, or likelihood.". This equates knowledge to understanding, analogous to academic views stated in the literature review of the dissertation, and is reflected in the proposed definition of knowledge of the dissertation. So, within these two paragraphs of DODI26 (17) knowledge is equated to information and processed information is regarded as knowledge. Business intelligence is perceived as a critical enabler. In the researcher's opinion, it is probably just a matter of poor attention to detail and the ability to articulate thinking clearly by the policy writer in this case. This might, in fact, be the case in many instances within the selected sample of SA DODI Level 1 policy and doctrine. These issues can be corrected with an authoritative SA DOD taxonomy managed within a coherent and integrated SA DOD KMC. It will provide unambiguous policy and doctrine that will enhance decisions, actions, effects and advantage at all levels of the organisation.

Uncertainty is also expressed on from an intelligence and knowledge perspective. JDP4 (D1-4) equates knowledge to intelligence and also that a lack of both these two constructs contributes to uncertainty in operations and the accomplishment of the mission. JDP4 (D1-4) defines uncertainty as - "… a lack of knowledge essential to the accomplishment of a mission. The lack of intelligence and purposeful deception actions by the enemy are the main reasons why most commanders experience a high degree of uncertainty during combat situations". Uncertainty is distinctly linked to situational awareness and to decision-making (or the lack thereof) and subsequent action/non-action. It is thus clear that knowledge enhances the ability of leadership to take decisions and enable actions by reducing uncertainty. The researcher agrees with this policy statement.

In this paragraph knowledge and intelligence are used interchangeably as if the reader should intuitively understand these two constructs as being the same. From the military KM (dissertation Chapter 3), intelligence is indeed perceived as capstone military knowledge. When following the logic of the definition provided for 'uncertainty' – i.e. a lack of knowledge/intelligence – then a

supply or abundance of knowledge/intelligence should then result in certainty which is a powerful state of mind to be in when decisions and actions are pending in order to deliver a specific effect and secure advantage. Thus, it is knowledge that is perceived to be strategic and not information.

SANDFP3 (15-7) defines intelligence as the – "Product resulting from the collection, evaluation, analysis, integration and interpretation of all available information which concerns one or more aspects of importance to an intelligence or security service". Thus, intelligence is a product, probably better described as a knowledge artefact, of processed information (also in JWP1 (8-3)). Intelligence is not information. A gap in this definition is probably that it should include data and knowledge in the definition. The definition assumes that data has been processed to construct information or that intelligence cannot be constructed from just data. It also assumes incorrectly that knowledge is included in information because of the definition of SA DOD information in various policies and doctrine. The researcher is of the opinion that intelligence is the knowledge artefact that stems from processing knowledge continuum artefacts originating typically from organisational IC.

JWP1 (8-3) states that essential elements of information (i.e. combinations of who, what, why, where, when, how, which effects and what thereafter) are the building blocks of intelligence. DODSPF1 (18) separates information and intelligence as constructs. The researcher agrees with these policy statements. This is contradicted by DODI50 (12) that equates intelligence to information. From Chapter 3 of the dissertation, intelligence is regarded as capstone military knowledge and not information.

JWP8 (4-10) discusses the dilemma of using 'military intelligence' in PSOs. The UN prefers 'military information' for various reasons which is outside the scope of this dissertation. Supporting this preference, JWP8 (4-10) states that - "The parties to a conflict, and even some Mission elements may perceive the gathering of intelligence as a hostile and sinister action. It is for this reason that UN-led operations deliberately replace the term military intelligence with 'military information'.

However, JWP8 (4-10) states further that - "To ensure no misunderstanding within the context of the SANDF for which this JWP is intended, the term 'intelligence' must be maintained. 'Intelligence Integrity' must be established and maintained; this involves the physical management and conduct of [IntOps].". It supports that intelligence is not information – and the SANDF is adamant about this. This policy statement aims at eliminating construct dissonance. However, IntOps is still clustered within InfoOps and IW constructs. This might leave a novice perplexed as to the differences. For this reason, the researcher proposes KW as the catch-all construct within which to cluster various knowledge continuum-related operational and warfare concepts.

JWP8 (1-6) states that JWP is doctrine and it provides information about - "… practical guidance for military commanders, staff and personnel involved at the operational level in peace missions.". This statement incorrectly equates doctrine to information. Doctrine is capstone military knowledge that provides practical guidance. JWP1 (1-2) states that knowledge is a part of doctrine in the following definition -

> "It is the body of corporate concepts, knowledge and beliefs that provides [*sic*] a common approach and way of thinking and that informs the making of decisions and the creation of

> policy, strategy, orders, instructions, rules and procedures. A sound understanding of an organisation's doctrine, which comes firstly with the insight gained, for example, in the initial training and/or orientation received on joining the organisation, and later from experience achieved simply by working within the organisation and absorbing its culture [JDP4 (B-1) propose knowledge to be part of culture], enhances the understanding of strategy and policy and should be sufficient to guide any element of that organisation, down to the individual responsible for planning and executing activities, to a reasonable chance of success in any endeavour of the organisation, even in the absence of any other policy, guidelines, orders or instructions.".

JWP1 (1-2) states further that - "… the purpose of military doctrine is to structure knowledge of warfare (also in JWP4: 1-2), unbound by prescriptive rules, to enable clarity of thought in the chaos and crisis of war,…". These definitions and descriptions do not contradict discussions in the literature review (dissertation Chapter 2) and military KM (dissertation Chapter 3). These definitions are fundamental to SA DOD KM and a KMC. The description recognises the importance of the process of understanding in knowledge formulation. It recognises doctrine as capstone military knowledge and SA DOD IC. It recognises the link between doctrine and other knowledge constructs as well as decisions and actions. It informs the development of other types of capstone military knowledge such as "… policy, strategy, orders, instructions, rules and procedures". DODI26 (17) makes these confusing statement –

> "Business process modelling captures fundamental enterprise business knowledge and displays this information graphically. These models give executives, business staff, and ICT departments a complete view of the "big picture" of end-to-end process chains spanning the business. The models also make it possible to drill-down to details driving the day-to-day organisation. This top-down approach leverages business intelligence and enables a fluid, efficient and strategy-aligned enterprise.".

This is another glaring example of construct dissonance. Knowledge is equated to information and information to intelligence. By exchanging the construct 'information' with 'knowledge' or 'intelligence', this paragraph would be much more accurate. Using the constructs of information and knowledge interchangeably is endemic to SA DOD policy and general thinking and practice. It results in decisions being based on information rather than on knowledge; probably resulting in the incorrect decision, less desirable actions and effects and a loss of advantage.

JWP8 (5-16 and 17) states that Electronic Intelligence (ELINT) and Signal Intelligence (SIGINT) can provide useful PSO domain related data. ELINT and SIGINT systems and sensors provide data and information required to be processed into intelligence. Such intelligence might then be labelled ELINT and SIGINT. The current format lets the reader believe ELINT and SIGINT are data.

The fact that data, information and knowledge share various characteristics and functional/management processes could also perpetuate construct dissonance. The following table represents a list of characteristics that are shared by data, information and knowledge as distinct constructs as found in the selected sample of SA DOD Level 1 policy and doctrine and based on the discussions in Chapter 2 of the dissertation:

Table 6.3: Construct Characteristics

Construct	Data	Information	Knowledge (policy, doctrine, intelligence and IP)
Characteristics	reliable, accurate, current, centralised, integrity, trustworthy, timeliness, presentation, formatted, compatibility, validity, correlated, fusioned, processable and quality	useful-, understandable, relevant, secure, appropriately classified, authorised for publication, confidentiality, integrity, timely, tempo, accessible, adequate, accurate, consistent, complete, coherent, up-to-date, current, in-time, compatible, availability, quality, reliable, credible, valid, transparent, materiality[82] and veracity/authenticity	integrated, reliable, accurate, current, centralised, integrity, trustworthy, timeliness, presentation, formatted, compatibility, validity, correlated, fusioned, good, real-time and near real-time
Reference	DODI1, DODI22, DODI24, DODI40, DODI48, DODI57, DODI61, JDP1 and JWP8	DODD4, DODD10, DODI12, DODI24, DODI27, DODI39, DODI48, DODI61, IDODI2, JDP3, JDP4, JDP9, JWP1 and JWP8	DODI31, DODI40, DODSPF1, JWP4 and SANDFP3

There is a significant overlap with the characteristics identified for knowledge. This is possibly due to the interchanged use of the constructs by the SA DOD. Most of these characteristics for knowledge were described in the literature review (dissertation Chapter 2) from the perspective of the KMI. These should thus be pursued both for data and information in order to have enhanced building blocks correctly configured to be transformed into knowledge. JWP1 (1-4) states objectives of Corporate Communications in operations as (amongst others) –

> "Advance the military operation through the creation of timely and relevant information products. … Defend and protect the operation from unjustified criticism and misinformation … Counter propaganda [*sic*], false information and hate messages that are harmful to the objectives of the operation and the achievement of peace".

The importance of timely, relevant and accurate information and the management thereof is highlighted throughout the policy. Due to the rapidly changing environment and the requirement for the SA DOD to be able to adapt, this requirement is critical to the achievement of SA DODs operational objectives.

JWP1 (1-7) states the importance of -"…timing, timelines and tempo of information flow and communication". The tempo for the availability of knowledge and new knowledge, in particular, will be determined by the tempo of business (policy and IP) and/or operations (intelligence and

[82] "Information is material if its omission or misstatement could influence the economic decisions of management made on the basis of the financial statements of the DOD. Materiality could be either qualitative or quantitative, depending on the specific circumstances." (DODI48: A-2)

doctrine) This will certainly influence the tempo of decision-making, actions required, the timing of effects to be achieved and possible advantage.

Continuing with the discussion on the construct dissonance, consider the following quote from JWP8 (6-7) – "Within RSA, national early warning mechanisms will assess data provided by the intelligence community for the discretionary utilisation at the political and military strategic level". It would be very dangerous from a principle of war perspective if commanders/decision-makers at the political and military strategic level base their decisions on data. JWP8 (6-7) states further –

> "The heart of the [African Union Continental Early Warning System] will consist of a Situation Room that will be part of the Peace and Security Department of the [African Union]. The Situation Room will, in turn, be linked to the observation and monitoring units of regional organizations who will collect and process data at their respective levels and transmit the same to the continental Situation Room. Within RSA, national early warning mechanisms will assess data provided by the intelligence community for the discretionary utilisation at the political and military strategic level.".

The quote above wants the reader to believe that the intelligence community collects only data and that this data is then shared with the situation room to act on. This is probably not correct and results from a poor understanding of intelligence. The intelligence community collects data, information and knowledge and subjects it to the intelligence cycle which allows it to be shared with users in the form of intelligence artefacts (or currently described by policy as products).

DODI1 makes reference to KM within the context of document management (content management on digital repositories). No further explanation is provided as to the KM process. It wants the reader to believe that content management is KM, creating construct dissonance.

The discussion above provide documentary evidence that the SA DOD is not necessarily disinterested in knowledge or KM, but is thoroughly confused about the various constructs clustered in the knowledge continuum, their use and value – hence they do not engage in coherent KM.

6.2.1.9 Capstone Military Knowledge Silos

The SA DOD manages several categories capstone military knowledge, as stated and discussed thus far in the dissertation. This may support the perception that the SA DOD is interested in KM. However, the knowledge silos point to the fact that SA DOD knowledge is not managed in a coherent and integrated manner possibly resulting in less than optimal decisions, actions, effects and advantage.

There is no mention of a CKO in the SA DOD; not in legislation, the DR 2015 nor in SA DOD Level 1 policy and doctrine. However, the selected sample of SA DOD Level 1 policy and doctrine express on the management of policy, doctrine, intelligence and IP (amongst others). This is done mostly in a silo approach. These capstone military knowledge domains are not managed in a coherent and integrated manner by an SA DOD CKO and with a dedicated KMC as can be found in business and in e.g. the USA military. The result is that SA DOD KM remains fractured, in silos,

with no coordinating structure and function such as provided by a KMC to ensure coherence and integration.

The SA DOD does have a CIO (i.e. the Sec Def). This brings us back to the construct dissonance. The SA DOD regards most, if not all, the capstone military knowledge as information (per definition), and thús the requirement for a CIO and not for a CKO. This state of affairs possibly also drives the notion that information is strategic (based on the legislative requirement for a CIO and not a CKO) and that decisions, actions, effects and advantage should be based on information. However, from the discussion in Chapters 2 and 3 of the dissertation, there is a broad academic and applied recognition that information and knowledge should be separated and managed distinctly and that it is knowledge that drives enhanced decisions, action, effects and advantage.

6.2.2 Why Should the SA DOD be interested in Knowledge Management?

The importance of KM was discussed in Chapters 2 and 3 of the dissertation. The importance is mostly based on the perception that knowledge is a strategic resource and asset and a driver of advantage. No mention of the importance of KM for the SA DOD could be found in legislation or the DR 2015 (dissertation Chapter 5). However, SANDFP3 (11-10 and 11-20), promulgated in 2007, identifies knowledge as a primary source of power. This fact was already recognised in the SA DOD *circa* 2007 but did not filter into comprehensive policy and structure up to now (mid-2017). Therefore the question – should the SA DOD be interested in KM? Some perspectives have already been provided above that the SA DOD should be interested in KM because of the coherence and integration it would provide to the SA DOD towards recognising knowledge as the driver of advantage instead of information, assisting the SA DOD to enter knowledge era thinking and practices, eliminating construct dissonance, integrating knowledge silos, and providing knowledge policy in various forms. The following discussion will delve into more reasons why the SA DOD should be interested in coherent and integrated KM and a KMC.

6.2.2.1 Complexity

The SA DOD operates in a very complex business and operational environment. This complexity generates infinite amounts of data, information and knowledge, requiring appropriate management thereof for it to be useful. JDP4 (D1-5 and 6) provides a brief summary of the complex environment in which the SA DOD must operate –

> "Leaders … are experiencing increasing complexity and diversity of tasks and are subject to competing demands from the external environment and the internal organisation. Advances in technology are placing complex aids at the disposal of commanders that increase the flow of information available to them. This places a premium on the ability of a commander to absorb a mass of information and to make rapid decisions…Organisations today are faced with a rapidly changing environment characterised by uncertainty, turbulence, complexity and unpredictability. Furthermore, the increased diversity of the workforce causes certain shifts in socio-cultural values. The [SA] DOD is no different, and in addition, faces variables like a shift in its role because of the absence of a military threat to the country, budgetary constraints, and the typical demands that a liberal democracy place on military forces".

JWP4 (2-7) also acknowledges the fact that commanders are swamped with data that requires analysis and processing before it is useful to them. No mention is made of the importance of knowledge and its management towards reducing this complexity – only information. This is typical information era thinking and practice and possibly the result of construct dissonance. Successful, highly competitive organisations such as the USA military have adopted knowledge era thinking and practices to reduce their dependency on information in favour of knowledge in order to gain and sustain advantage.

DODI26 (12) links data systems to enhanced organisational control. Control is invariable a casualty in complex organisations and environments. No mention is made of information- or knowledge systems. One would expect that control is much closer associated with 'knowing' (i.e. knowledge) than being informed with only data. This is a predicament resulting from construct dissonance and information era thinking.

There are at least 42 different policy documents in the selected sample of SA DOD Level 1 policy and doctrine that make reference to databases and associated systems of various kinds. This is a snapshot of the complexity of knowledge continuum artefacts currently available in these various repositories. These databases are not static but expand day-by-day. SA DOD policy also makes reference to knowledge-bases, which adds more layers to the complexity to what is known by the SA DOD. This is just explicit knowledge and does not even begin to comprehend that vast amount of tacit knowledge that is available in the form of know-how, experience, skill, judgement, insight, etc. Then there are the complex relationships internal to the SA DOD between various people and between various positions. These are overlaid with external relationships with stakeholders and role-players.

The SA DOD should thus be very interested in KM – because of the volumes of knowledge in existence and currently managed by the SA DOD with no KMC and KM policy and doctrine that ensures coherence and integration.

6.2.2.2 Knowledge and Knowledge Management Drives Decision-making, Action, Effect and Advantage

From discussions in Chapters 2 and 3 of the dissertation, it was found that decision-making, action, effect and advantage have strong dependencies on data, information and/or knowledge (amongst other things). If this is the case, then the researcher proposes that knowledge-based decision-making, action, effect and advantage be primary objectives of SA DOD KM. Several examples of linkages between information and decision-making, action and effect are present in the selected sample of SA DOD Level 1 policy and doctrine. There are even explicit examples of linkages to knowledge (e.g. intelligence and doctrine). SANDFP2 (1) clearly links doctrine to action by stating the criticality of doctrine for operations. JDP20 (3) states that both knowledge and thinking is important to take action. DODI1 (1-12) and DODI1 (Chapter 4) ties corporate communication doctrine inextricably to action and effects. These linkages are discussed in more detail below.

This symbiotic relationship should be understood within the context of the SA DOD definition for information to be inclusive of data and knowledge (be it correct or not). A good example of this is provided by JDP9 (8) with support in DODI57 (2), linking information to decisions, actions and advantage, stating the following –

> "The [SA DOD] Information Strategy[83] … endorses information as a strategic resource in support of the [SA DOD] business as it forms the basis for decision-making and effective management. It also emphasises the strategic importance that the resource "information" is managed over its total life cycle in an effective manner and standardised way in order to support the [SA DOD] in gaining a competitive advantage… In the [SA DOD] much of the information will be identified as a [SA DOD] record because it documents [SA DOD] activities or because of the value of the information it contains. Records are fundamental to policy formulation, decision-making, business operations and organisational accountability [and thus by implication information, inclusive of data and knowledge]. The process of records management captures evidence of an organisation's transactions, documents its activities and decisions and provides ready access to this evidence.".

There is almost nothing to be said further about this symbiotic relationship. DODI1 (4-9) states, from a corporate communication perspective, that it is paramount to understand that - "… doctrine is not policy, strategy, orders and instructions; it is the body … concepts, knowledge and beliefs that provide a common approach and way of thinking that informs the making of decisions and the development of policy, strategy, orders and instructions". This is also reiterated by JWP1 (1-1 and 2) and JWP4 (1-2). JWM1 (3-3) directly links command decisions to doctrine. JWP4 (4-2) states that - "Doctrine impacts on the conduct of the armed forces". This reinforces that fact that doctrine as capstone military knowledge and action is inextricably linked. This is an important statement because it links capstone military knowledge to other capstone military knowledge, to the way the organisation think (tacit knowledge) and subsequent decisions. Policy and doctrine are the primary leadership instruments within the portfolio of knowledge continuum artefacts. Leadership is about decisions, actions, effects and advantage, thus making knowledge a critical bonding agent between these constructs.

JDP4 (D2-5) links those responsible for SA DOD decision-making to a distinct need for knowledge and information to do so. There is a logical argument to be made for the need for information to make decisions, and not just knowledge. Depending on the impact of decisions on (typically) issues of survivability, effectiveness, efficiency, economy, advantage, etc.; the decision-maker will access either information or knowledge. It will sometimes be a pure case of availability. Realistically and from a practical perspective, good intelligence, for example, is not always readily available. Thus, decisions, actions, effects and advantage are very exposed to information and knowledge supply and demand cycles. This is why the SA DOD should consider institutionalising KM and establishing a KMC to take control of the supply and demand of the SA DOD knowledge continuum.

Not repeating the discussion above on performance information (IDODI2: 1 and 2); it is important for government and the SA DOD to apportion focus carefully between lagging indicators such as performance information and that of initiative and advantage drivers such as knowledge

[83] SA DOD Information Strategy Version 3.2 dated 18 January 2010. (DODI57: 2)

(e.g. intelligence, doctrine and IP). The SA DOD's focus should shift towards better performance, which requires knowledge to be recognised as strategic and managed accordingly. JWP4 (4-3) states the importance of information in the OODA loop (Figure 6.4 and 2.14) –

> "Attacking the Decision-making Process. A key characteristic of the conceptual component is the attacking of [Opposing Force] commander's decision-making process. This is done by attempting to make decisions at a tempo that outpaces the ability of the adversary to react in time effectively (get inside [Opposing Force] decision-making cycle). The Boyd Cycle or OODA loop consists of the following parts, namely observation, orientation, decision and action.".

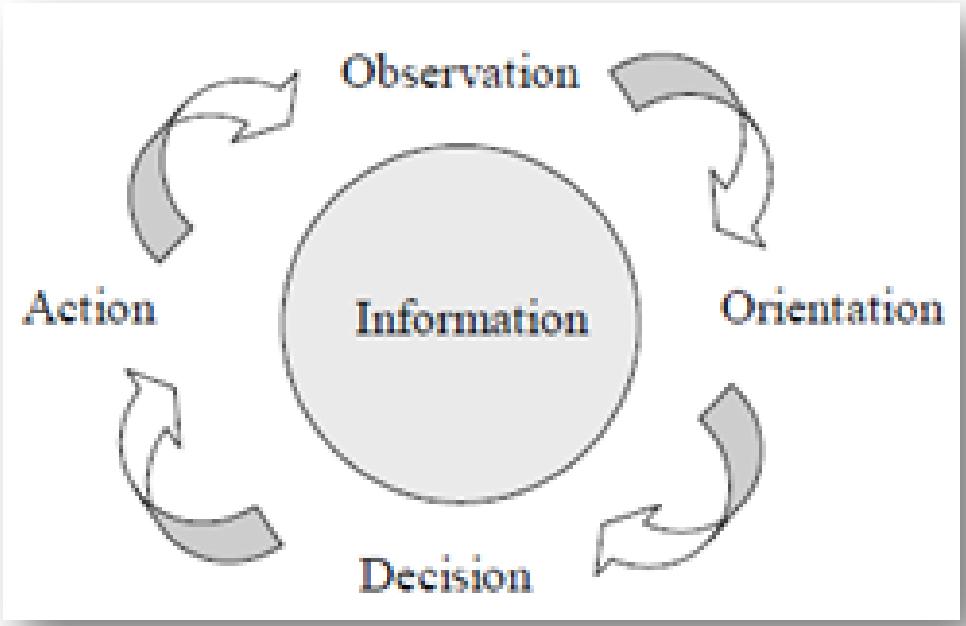


Figure 6.4: Boyd's OODA Loop

Source: JWP4 (4-3). See also Figure 2.14 in the dissertation.

What is missing from the OODA loop is the fact that at several points the information is processed by people and systems to facilitate understanding and to create new meaning (or knowledge). It is this knowledge that should form the basis for decision and actions to create the desired effect and sustainable advantage. Considering the discussion regarding the knowledge continuum, time component and granularity or density of knowledge (dissertation Chapters 2, and 6 thus far), the researcher combined these elements graphically in Figures 6.9a and 6.9b to portray their interaction with constructs such as usefulness and advantage.

The time-axis (vertical axis) in Figures 6.9a and 6.9b portrays the importance of the time-value of information and knowledge is stressed by several policies and doctrine. In other words, 'fresher' information and/or knowledge is conducive to better decisions, ceteris paribus. JDP4 (D3-8), JWP7 (1-5) and JWP1 (1-7) stress the importance of "up-to-date information" within a decentralised command (or where mission command is of primary importance). JDP4 (D3-5) states – "Timely decision-making and initiative at all levels are the keys to getting inside the enemy's decision-making cycle". SANDFP3 (14-3) supports decision-making/intelligence dependencies as well as highlight the importance of the time-value of intelligence –

"… real-time intelligence is required to formulate informed decisions for force employment activities. Defence Intelligence is to furnish advanced warnings of threats ensuring the timely update of the Military Strategy and subordinate strategies. This includes the ability to provide military insight in geo-strategic developments in Africa. Defence Intelligence must be equipped with strategic and operational collection sensors – inline [*sic*] with the Defence Act. Defence Intelligence must be enabled to provide integrated real/near real-time intelligence".

When the OODA loop is superimposed on this graphic, then it becomes clear that if the OODA loop is only based on data and information it will possibly short-circuit before advantage can be gained/sustained that is based on better understanding gained from denser context. The link between the knowledge continuum (inclusive of intelligence and its cycle), the OODA loop and a time axis can be graphically displayed as follows -

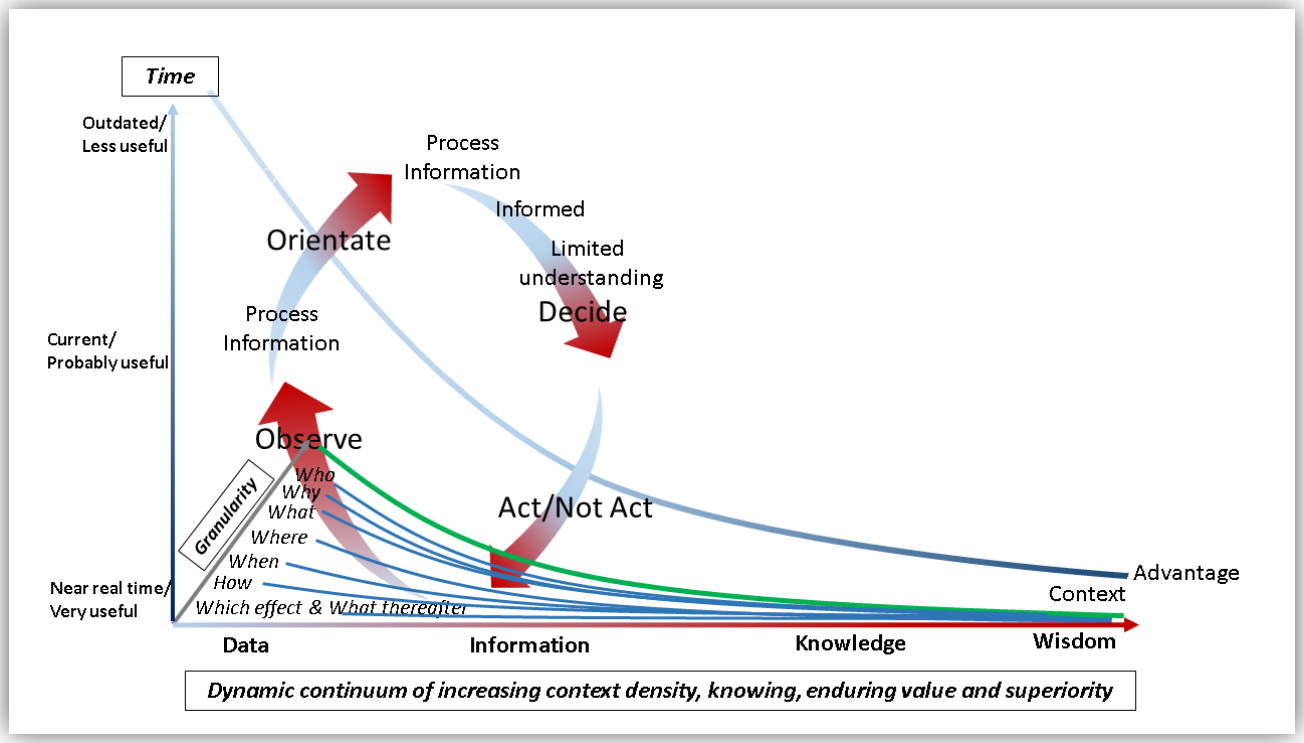


Figure 6.4a: Information-based OODA Loop Superimposed on a Three Axis Time-Granularity-Knowledge Continuum Graphic

Source: Author's compilation of information.

However, if the OODA loop is expanded to be inclusive of knowledge and its processes then a much denser context is developed that facilitate richer understanding and new meaning upon which to base decisions, actions, effect and advantage on. JDP4 (9) states the following about the OODA loop effect –

"Much of the art of command consists of a timely recognition of the circumstances and moments demanding a new decision. This is dependent on good judgement and initiative. The [SA DOD] approach to operations requires that the commander must aim to reach a timely decision in relation to an opponent's own decision-making process. Implicit in this is the ability to know if a decision is required at that level of decision-making, and if it is, when it must be taken. The requirement is thus to make the appropriate decision at the right time. In some circumstances it

will be wise for a commander to delay a decision if he/she has insufficient information, or when he/she is dependent on other decisions yet to be made. However, fleeting opportunities should be grasped. [Figure 6.4b applies] Thus many tactical decisions, in particular, will have to be made on the basis on incomplete information. He/she who always waits for the latest available or "complete" information, is unlikely to act decisively or in good time" (Figure 6.4a applies).

Thus, at the strategic operational and strategic level knowledge should be the basis for decisions, actions, effects and advantage. At the tactical level and based on the scarcity of sometimes good intelligence, decisions, actions, effects and advantage it should, more than often, be based on information. Figure 6.4b below is relevant for operational and strategic scenarios -

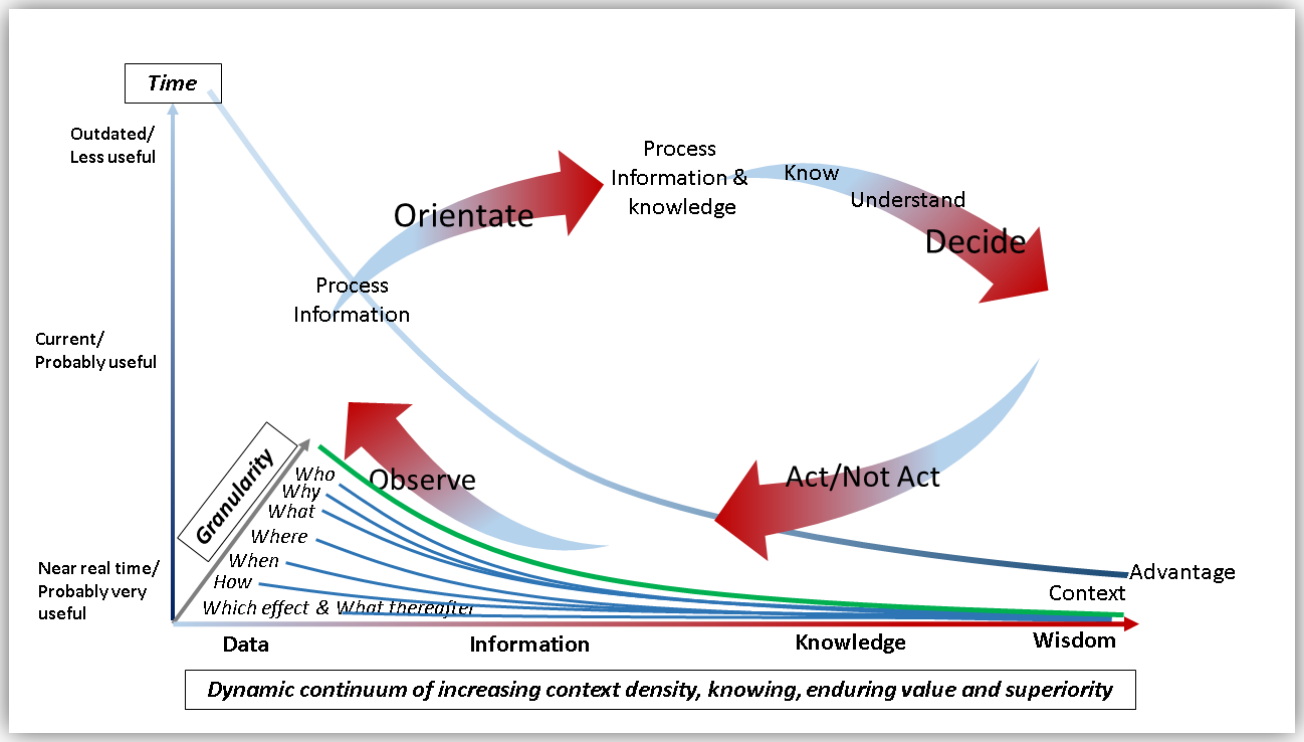


Figure 6.4b: Information- and Knowledge-based OODA Loop Superimposed on a Three Axis Time-Granularity-Knowledge Continuum Graphic

Source: Author's compilation of information and proposed for SA DOD KMC and KM.

This decision-making cycle is dependent on both information and knowledge (e.g. intelligence) – but probably optimised best with a complete and real or near real-time intelligence picture. A coherent and integrated SA DOD KMC employing KM (and processes such as the intelligence cycle) is critical to achieving this. When considering the importance of knowledge to gain an advantage; JWP1 (1-6 and 7) states the following within the context of corporate communications but relevant in general –

"The Information Domain, in which information is seen as the essential factor in making decisions and as a critical war-winning factor. In this domain, one finds two distinct aspects, namely [IW] and information in war. Information in war, with which Corp Com is associated, concerns using information to make better decisions. Modern information systems and infrastructure have contributed to more effective use of information, which in turn contributes to the achievement of an operation's objectives by allowing rapid exploitation of opportunities. In

addition to elements commonly associated with information in war, such as [C^4I^3RS] systems, Corp Com contributes in its own way to situational awareness, shaping the battle space by affecting public support and reinforcing morale.".

Knowledge is thé 'war-winning factor', i.e. the use of superior policy, doctrine and intelligence to dominate the adversaries of the OODA loop (illustrated by Figure 6.4b above). Data and information provides building blocks (who, what, why, where, when, how, which effects and what thereafter) required for processing to generate capstone military knowledge that will shape the battlefield, ensure precise effects and assure the winning edge.

Amongst other fundamentals, SANDFP3 (4-3) states that - "No operations can take place without intelligence at all levels of warfare. The ability to collect, integrate and disseminate real time [*sic*] data, information and intelligence in the decision-making process is essential". This paragraph states the SA DOD's understanding clearly with regard to the linkages between the constructs and decision-making and underlines the importance of what is graphically depicted in Figure 6.4b. JWP8 (5-23) states clear links between intelligence, decisions and actions within the context of the capabilities provided by Special Forces -

"[Special Forces] can provide timely information to political and military decision-makers and commanders. This contributes to the overall intelligence picture and may provide collateral for information from other intelligence, surveillance and reconnaissance systems, be used to cue such systems to confirm technical intelligence or to trigger interdiction [or action].".

It would be problematic if the decisions were based on information (only in tactical situations as described above). However, the statement implies further processing in the second sentence to compile an intelligence picture and to base possible action on. The role of SA DOD Special Forces is (amongst a host of other incredibly interesting things) to collect information and/or intelligence that would improve or complete 'the overall intelligence picture' or situational awareness or early warning and thus enhance decision-making, action, effect and advantage. This notion is also found in JWP1 (5-4) stating DI is a "… rich source of valuable information for Corp Com planning, particularly in terms of preparation for an operation or activity.". The notion that intelligence systems provide information is half the truth. Intelligence systems are there to provide both information and intelligence, depending on the type of system. JWP4 (5-10) defines early warning as follows –

"Adequate warning of an impending crisis is crucial. By adequate is meant sufficient information to provide political and military strategic decision makers with the necessary background and time to consider appropriate options. These options include both the possibility of early positive engagement leading to rapid effect, and that of avoiding inappropriate embroilment in a crisis. Links into the intelligence community and the ability to monitor situations around the world are paramount. The aim is to avoid being caught unawares, although, by their nature, crises are unpredictable.".

Early warning is a time-dependent construct as depicted in the time-axis of Figures 6.9a and 6.9b above and will in some cases be based on information. However, the statement above does not imply that decisions, action and effect should be based on it. If the military intelligence system functions, early warning will be based on intelligence which would enable decision-makers to use optimised actions for accurate effects and sustained advantage. Additionally, the notion that

political and military strategic decisions should be based on information is probably less than favourable. This opinion was also expressed by the researcher of the dissertation earlier in this chapter. If intelligence is not available to decision-makers at all levels of the organisation then there is a good reason to consider establishing a KMC that will focus on the KM leadership philosophy proposed by this dissertation – the art of knowing and the science of managing that knowledge to obtain and sustain advantage.

Figure 6.5: Leadership Philosophies

Source: Author's compilation of information.

JWP1 (1-8) states that all SA DOD corporate communication activities - "… should be based on scientifically authenticated principles [or knowledge] and information". These principles will typically be articulated in policy and doctrine, which is capstone military knowledge. This provides a clear link between knowledge and action.

As with the DR 2015, JDP4 (3-12, 15 and 16) states that mission command is SA DOD doctrine. Mission command is a type of leadership philosophy and approach to decision-making, control and action as defined earlier in the dissertation from a USA military perspective.

Therefore, doctrine is very important for decision-making and action. JDP4 (D3-2) links doctrine to the ability of the commander to exercise control. JWP8 (5-10) states the following about mission command and information -

> "Mission command negates the requirement for all but essential information to be passed up and down the chain of command so allowing appropriate decisions to be made rapidly in the confusion and uncertainty of land operations. During operations local commanders may have to use their initiative and might even break both the chain and states of command to ensure timely and effective action in unexpected circumstances. Their only guidance will be their training, experience and understanding of what they think their superior wants".

Doctrine is thus inextricably linked to decisions, action and effects and if executed correctly will assist in gaining an advantage. The proposed KM leadership philosophy is based on mission command as a philosophy as was discussed earlier in the dissertation. Thus, the proposed KM philosophy is linked to optimised decisions, actions, effects and gaining and sustaining advantage. This is exactly why the SA DOD should be interested in a KMC and KM.

JWP8 (5-15) states that helicopters during PSO provide both information and data that are critical from a reconnaissance perspective in order to facilitate command decisions and action. JWP8 (3A-25) links intelligence to the assessment of effects to be achieved by PSOs. Such assessments are critical for command decisions and action in order to respond to the changing conflict or humanitarian situation. It speaks to situational awareness and its links with decisions, action and effects.

DODERF1 (2-2 and 4-11) identifies a number of thematic risks facing the SA DOD of which knowledge risk is one and that the management of these risks must be integrated into the various levels of decision-making (i.e. strategic, operational and tactical). Without knowledge decision-making and subsequent actions and effects, as have been discussed thus far, becomes less than optimised. Knowledge risk identification and mitigation should thus be a primary task for a proposed SA DOD KMC, integrating the various knowledge risks stemming from the various SA DOD functional components into a single risk reduction strategy. This is what the art of knowing and the science of managing that knowledge to obtain and sustain advantage are about.

DODISPF1 (17-18) states (amongst others) that integrated defence intelligence and information form part of SA DOD requirements for action. That action typically stems from InfoOps, IW and IntOps as have been discussed thus far.

JWP8 (4C-4 to 5) and JWP1 (5-2) define InfoOps and IW at the conceptual level (as discussed in detail earlier in the chapter), directly linking its action with specific effects such as destroy and neutralise. When the pillars of IW, mentioned earlier in this chapter, are integrated they provide various knowledge continuum artefacts used for decision-making, action, effect and advantage. As stated earlier, these should probably be integrated into KW. However, because of the dissonance existing about the differences between information and knowledge, policy and doctrine will remain for years to come. Establishing an SA DOD KMC and associated KM policy and doctrine will accelerate the process of understanding a construct such as KW and its utility.

JWP1 (5-2) defines InfoOps and IW as quoted and discussed in section 6.2.2.8 of the dissertation earlier. The definition of PsyOps, as a knowledge-related operation within IW, not described yet, provides further clear linkages between decisions, actions, effects and advantage as follows -

> "PsyOps are planned [decision] psychological activities in peace and war [actions] directed at enemy and neutral audiences, create attitudes and behaviour favourable [effects] to the achievement of political and military objectives [advantage]. These operations include psychological action that encompasses those political, military and economic ideological and intelligence activities [action] designed to achieve a desired psychological effect [effect]." (JWP1, 9-8).

Other supporting evidence that link knowledge to decisions, action, effects and advantage are in JWP8 (DEF-11) "Action taken, normally based upon intelligence, in anticipation of a possible situation arising, in order to stop it from occurring now or at any stage in the future.". Also, SANDFP3 (2-17) identifies "intelligence driven [sic] operations" to be directly linking intelligence to action. These operations will, invariably, have a specific effect in mind and will be linked to capturing advantage.

SANDFP2 (A-9) states that "Joint Operational enablers, such as operational intelligence, [InfoOps], force protection, etc. are vital for shaping the joint environment.". Shaping the environment has to do with effects achieved, based on the availability of intelligence and other operational decisions, actions and effects. If done correctly, the shape of the environment will be to your advantage.

These definitions and discussions above clearly link knowledge continuum artefacts and associated operational and warfare concepts to decisions, action, effects and advantage at the tactical, operational and strategic levels. The complexity of the C2 and technology relationships and networks between these constructs should motivate the SA DOD to optimise their output. This could be done under the umbrella construct of KW as have already been proposed by the researcher of the dissertation. This will require the SA DOD to become interested in knowledge era constructs such as KM.

From the discussion above on the various elements of IW and possible KW, the researcher of the dissertation proposes the following graphic representation of these concepts to illustrate the complexity thereof and their relationship with effect - as follows:

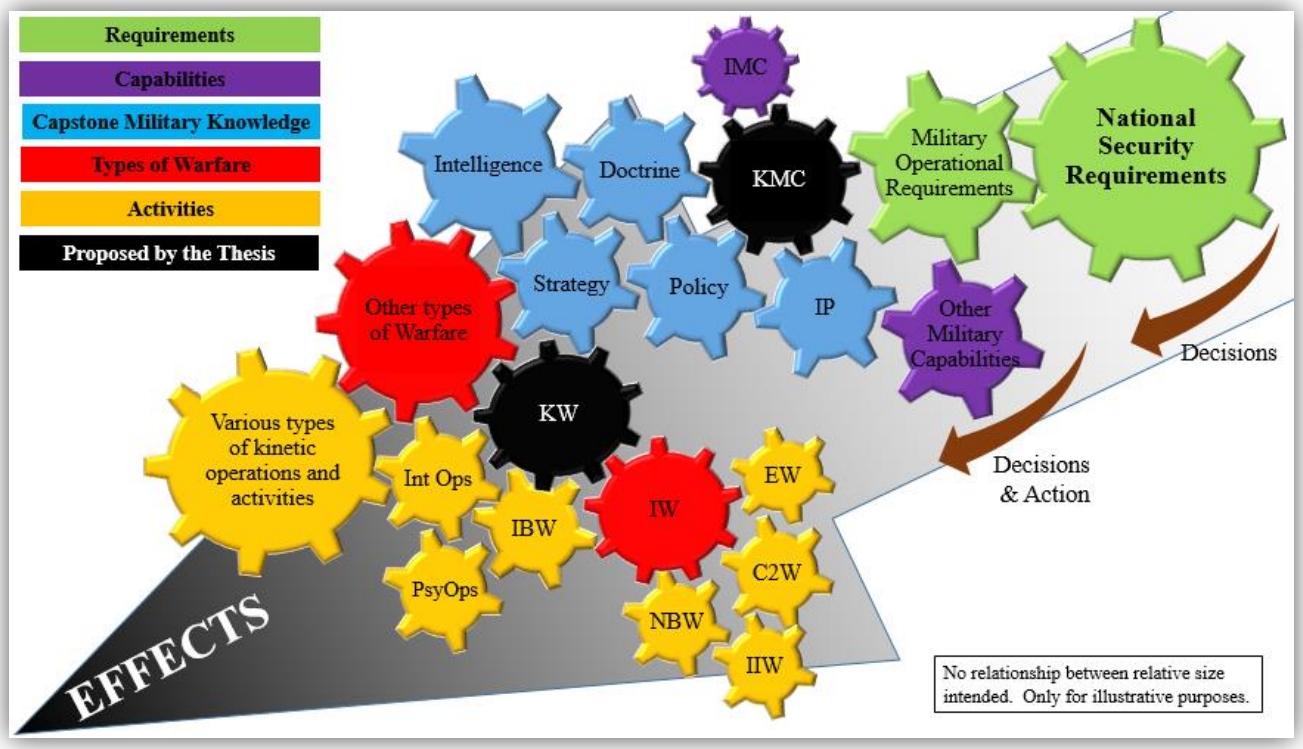


Figure 6.6: Complex Relationship between Information Warfare, Knowledge Warfare and Effects

Source: Author's compilation of information.

SANDFO3 (1) states the critical requirement for information transmission within the context of frequency spectrum management. It states –

> "One of the SANDF challenges in the execution of its missions is the ability to exchange information between decision-makers from the strategic level down to the tactical levels of command and management. This requirement for the exchange of information at all levels of command and management means that the SANDF must have sufficient dedicated frequencies for use over the SANDF Information and Communications Systems, to enable command and control in the execution of SANDF authorised missions".

Linked to the problem of information overload; JWP4 (5-10 and 11) states the following about management information –

> "The management of information presents a wide range of difficulties. The essential problem is that of quantity and the selective dissemination of that which is relevant to conducting effective operations and to managing crises. The crisis management authority has to cope with large amounts of information by selecting that which is important and ignoring that which is not. Analysis of information planning is an important step in the planning process, which needs to be completed for any crisis likely to lead to involvement by the armed forces.".

DODI22 (5) states the following about the SA DOD management information capability - "… management information capability (data warehouse) utilises the data of the organisation life cycle systems as their backbone (reference source) to structure management information reports for decision-making by top management.". This confirms that information is the foundation for decision-making in the SA DOD.

From the discussion about management information (the volume, distribution, relevance, priorities, analysis, etc.) it is clear that the SA DOD uses information to base decisions on. Within the context of construct dissonance already described, management information probably also contains data and knowledge, which provide a glimmer of interest in knowledge.

Highlighted by these statements is the criticality of information sharing as linked to bandwidth for decision-making at all levels of the SA DOD and IT an important enabler to accomplish it. This will have the same impact on knowledge sharing. Although, there is generally not an overload of knowledge so the sharing should be less cumbersome and have a lesser requirement for bandwidth from an IT perspective. This illustrates the problem when decisions and actions are based on information. The sharing of information becomes problematic when the system is overloaded. A KMC should be designed to reduce these masses of data and information to decision quality knowledge. This is why the SA DOD should become interested in a KMC.

Taking the discussion further regarding IT as an enabler to knowledge sharing, SANDFP3 (10-3) states with regard to C2 that – "The technological focus should be to provide the force with an integrated, real-time digital information and communication system that will ensure decision superiority in operations and peacetime activities". There is again recognition of the value of quick

communication to facilitate 'fresh information'. These issues have been addressed in discussions earlier in this chapter. On another tack, information technology might enable information and knowledge flow but it will not provide decision superiority. Decision superiority is dependent on a complex mixture of cognitive processes and knowledge. To integrate these complex processes and the available knowledge continuum artefacts will require a coherent and integrated SA DOD KMC.

JDP16 (A-3) links knowledge directly to action within the context of competence. From the literature review, this is one of the primary reasons why organisations acquire, generate and manage knowledge – i.e. to enable action. JWP4 (2-21) defines indirect action as – "… denying to an opponent the availability of key resources or capabilities that he requires to pursue the interests or objectives causing the conflict or potential conflict. Included are information resources and human and physical resources. Indirect action can be used by a nation, a coalition or, more generally, by the United Nations or even the African Union.". The knowledge continuum is thus recognised to be linked to all forms of action.

JDP9 endorses information as the driver for decision-making and gaining competitive advantage – not knowledge. This is contrary to the discussions and findings of Chapters 2 and 3 of the dissertation but is probably based on the SA DOD policy position that information includes all data and knowledge. This of course directly links knowledge to decision-making and advantage.

The writer of JDP9 alludes to a 'knowledge-based' system that is fed with the information that is critical to decision-making, policy formulation and business operations. No mention is made of such a system anywhere else in policy. Information management is distinctly linked to corporate memory. If corporate memory becomes corrupt, unstable or extinct advantage will certainly be lost. JDP9 (8) states that records management is a subset of IM. As such the following is stated –

> "In the [SA DOD] much of the information will be identified as a [SA DOD] record because it documents [SA DOD] activities or because of the value of the information it contains. Records are fundamental to policy formulation, decision-making, business operations and organisational accountability.".

Thus, although not explicitly said, and severely hampered by construct dissonance, IM is an important enabler to a proposed KMC. In order for the SA DOD to manage these disparate approaches the knowledge continuum, serious consideration should be afforded to the establishment of an SA DOD KMC practising coherent and integrated KM.

6.2.2.3 The Importance of the SA DOD Capstone Military Knowledge Portfolio

The SA DOD manages several types of capstone military knowledge as were discussed thus far in the dissertation. This fact contributes significantly to the requirement for a coherent and integrated SA DOD KMC because of the complexity of integrating the SA DOD knowledge continuum in order to reduce complexity through information overload mitigation, enhance mission command and other military operational constructs and in general facilitate the continuous creation of new meaning and understanding that provide insight to decision-making and operations. This is the collateral that a proposed SA DOD KMC would provide.

Knowledge management is encouraged because of the strategic nature of knowledge and being fundamental for decisions, action, effect and advantage. The categories and types of knowledge identified in the selected sample of SA DOD Level 1 policy and doctrine will be discussed in greater detail in section 6.2.4. of the chapter. The following paragraphs provide quotes from the selected sample of SA DOD Level 1 policy and doctrine in support of the importance of various capstone military knowledge that the SA DOD owns and manages.

There are much policy and doctrinal support for the importance of intelligence to the SA DOD. JDP4 (D3-10) states that intelligence is a principle of war and this refers to 'knowing' and the capabilities that assure this. The 'art of knowing' as proposed by this dissertation as KM leadership philosophy is thus eloquently aligned with this principle of war.

Principles of war are those principles that when resourced and applied correctly assure advantage. JWP4 (3-2) states the following about the value of intelligence –:

> "Information and Intelligence. From the earliest generals grasped the importance of having good intelligence and denying it to the opponent. Not only is intelligence required to obtain the best results in war, but also good planning to deny the opponent intelligence by deception, surprise and well thought out stratagems, are essential".

Although information and intelligence are grouped together in the heading to the quoted paragraph above, information is not mentioned any further, and correctly so. This is supported by JWP1 (1-7) stating that knowledge is a distinct requirement to obtain and maintain the initiative (initiative being perceived as a form of advantage). The importance of intelligence is further explained by JWP4 (3-7) stating that – "The continuous provision of in-time and real-time intelligence is a fundamental and indispensable requirement for the conducting of warfare". SANDFP3 (4-3) states that – "No operations can take place without intelligence at all levels of warfare. The ability to collect, integrate and disseminate real time [sic] data, information and intelligence in the decision-making process is essential [OODA loop].". Intelligence is the driver of advantage and is thus regarded as strategic to the SA DOD survival and winning edge. Note that these statements make continuous reference to the time value of intelligence, an aspect included in Figures 6.9a and 6.9b and fundamental to the OODA loop, effects and advantage.

Capstone military knowledge in the form of intelligence is strongly linked to 'early warning' (JWP4: 5-10). Early warning depends inextricably on the domination of the OODA loop (as discussed above). These constructs fuel initiative or advantage. JWP8 (6-6 and DEF-3) defines early warning as – "… process of collection, verifying and analysing information and communicating the results to decision makers". An early warning will in some cases be based on information. However, if the military intelligence system functions, early warning will be based on intelligence which would enable decision-makers to use optimised action for accurate effects and sustained advantage.

DODI31 (2, 7, 11) states that chemical, biological and radioactive defence is based on intelligence (amongst other things) in order to have early warning. JWP8 (4-8) also discusses the directing of intelligence resources and thus the production of intelligence in order to facilitate early warning. JWP8 (4-11) states - "… military intelligence will meet a vital early warning requirement

in monitoring and reporting those aspects that may destabilise or escalate the overall security situation".

JWP8 (4-10) describes two intelligence processes within the context of IntOps, stating its importance in terms of the responsibility within a peace mission to provide situational awareness –

> "… geopolitical and economic assessments and therefore cover the full spectrum of intelligence support and not just military intelligence. The SANDF [DI] will take a role in fulfilling this need. The flow of information to and from the JOA must thus be guaranteed and provided to ensure comprehensive situational awareness by the decision makers within the mission area and RSA.".

The quote above differentiates between 'full spectrum' intelligence (JWP8: 4-11 – label this strategic intelligence) and military intelligence, thus alluding to a much wider intelligence capability, underlining the importance of intelligence for situational awareness at national or departmental level. This requires a proposed SA DOD KMC to recognise the dependencies on other RSA government departments for data, information and knowledge. As such, structures within the intelligence community is the South African National Intelligence Coordinating Committee and National Intelligence Agency, South African Secret Service, South African Policy and Department of Health (SANDFP3: 2-19 and 6-4) are relevant stakeholders. It supports the call for coherent and integrated SA DOD KMC to manage knowledge across organisational boundaries. DODI46 (1) states that data is a change driver for the construction of maps and mapping process –

> "The world of maps and mapping has undergone profound changes as a result of developments in data gathering and processing technology. While hardcopy maps still have an important role to play in everyday life, most disciplines, particularly the military, increasingly rely on the collaborative analysis of data from a variety of data sources and databases. The emphasis is on adding value through the extraction and fusion of data relevant to a specific purpose. In the military environment geospatial data is extensively used in electronic format, embedded into weapon systems. Aerial imagery is a critical component of the overall system, but must be seen in that context, rather than as a separate means of information collection.".

These perspectives on imagery underline the requirement for coherence and integration of the SA DOD knowledge continuum. This integration should not only be internal but also with stakeholders from other government departments and business (where applicable) and in the national interest. DODI46 (1) states the importance of imagery as a form of intelligence -

> "Aerial photography or imagery is important for both civilian and military purposes. … The military use [*sic*] it for specialised purposes such as imagery intelligence, operational planning and target acquisition. … Such imagery is part of a greater system of information collection and intelligence production"

Military intelligence in the form of imagery not only supports military operations but also those of certain civilian endeavours (possibly in the domains of agriculture, policing, communications, etc.). Intelligence as capstone military knowledge thus has cross-departmental value and importance. Intelligence is thus a fundamental component of the SA DOD knowledge portfolio, underlining its criticality to obtain accurate effects and sustained advantage.

JWP8 (1-12) states that intelligence is critical to any peace mission and therefore PSOs. JWP (3A-7) states the importance of intelligence in the determination of an operational culmination point. An operation has culminated when the operational advantage has been lost or where the operation can only be maintained (in other words, stalemate). Therefore, intelligence can provide the tipping point to gain advantage and win. For militaries, the gaining or having the initiative is a principle of war and a prerequisite for enhanced decision-making, action, effects and advantage. Capstone military knowledge (in particular intelligence) is thus regarded as the driver of advantage due to the fact that it creates new meaning and facilitates understanding - as reflected in the proposed definition of knowledge and KM for the dissertation.

Knowledge as a resource is stated as important to the SA DOD. Knowledge is a pre-requisite to SA DOD fighting power (JWP4: 4-3). Fighting power within this context is probably asset based not action-based. However, the potential of the asset (fighting power) to support certain actions and gain certain effects is linked to the knowledge on how to apply (the commander's imagination and intuitive abilities) fighting power. Knowledge is thus important from several perspectives; as an asset to augment capability as well as the knowledge to apply the military capability.

A number of resources that are required to be considered when policy is crafted are identified by DODI53 (10, 12 and A-3). Information is one such resource mentioned. No explicit mention is made of knowledge (doctrine, intelligence, IP and other SA DOD policy). Expanding on the opinions raised in DODI53, DODSPF1 (15) provides a graphic of the SA DOD strategy map that illustrates which resources are to be managed (see Figure 23: SA DOD Strategy Map as used earlier in the chapter). The strategy map states that information, intelligence (also in DODSPF1: 17-18), matériel and people are considered resources. These resources are linked to action - "…what we use to do our work" (DODSPF1: 17). From a knowledge perspective, this would then include defence matériel related IP and tacit knowledge inherent in people. No explicit mention is made of doctrine and SA DOD policy as resources. Mention is made of doctrine that needs renewal in the 'building for the future' line of the SA DOD Strategy Map. This implies that doctrine should be in existence and be regarded as a valuable resource – though not mentioned specifically as such. Considering that specific knowledge is identified by the SA DOD Strategy Map (in contrast to not any physical capability mentioned), it can be stated without doubt that knowledge is regarded as strategically important to the SA DOD. It would be very reasonable to expect the SA DOD to be interested in a coherent and integrated KMC.

DODI54 is one of several SA DOD Level 1 policies that makes mention of resource system owners of resources such as finance, HR, logistics, matériel and information (DODI54: 4). Although capstone knowledge is implicit in most of these, none of them is explicitly stated as resources. It might be because of the notion that military knowledge forms part of the construct of information as per the definition of information. This makes it difficult for the SA DOD to understand the importance of the portfolio of military knowledge owned by the SA DOD and the requirements for coherent and integrated KM. This possibly also feeds the perception that the SA DOD is not interested in KM, contracting the SA DOD Strategy Map discussion above that makes it clear that this is a requirement.

Knowledge is important to communication in the SA DOD. JWP1 (2-2) states that pre-planning of corporate communication operations should be based on a knowledge-base. JWP1 (3-

3) states that a critical success factor for internal communication is messages that are based on knowledge. JWP8 (4C-2) states knowledge is a pre-requisite for pro-active communication. Thus, knowledge and knowledge-bases are important to the SA DOD from a communication perspective.

Thus, knowledge is an important SA DOD resource for fundamental functions and military constructs of the SA DOD such as early warning, situational awareness, initiative, advantage, communication, firepower, etc. For the dividends and advantages stemming from the SA DOD knowledge continuum to be maximised, it requires coherence and integration.

6.2.2.4 Integration and Coherence

Without endeavouring to repeat what has already been articulated about coherence and integration; throughout Chapters 5 and 6 there are supporting arguments for coherence and integration of the SA DOD knowledge continuum, typically based on the complexity of the environment resulting in information/knowledge overload. "The essential problem is that of quantity and the selective dissemination of that which is relevant to conducting effective operations and to managing crises.". (JWP4: 5-10 and 11), summarises the predicament. Other issues contributing to complexity that results in requirements for integration are the continuous changing security environment and defence requirements, interaction between the SA DOD and international partners during operations and in defence diplomacy, between the SA DOD and other departments and local stakeholders and role-players, requirements for jointness in military operations, the divergent and fragmented SA DOD knowledge portfolio, the existence of paralysing construct dissonance within SA DOD Level 1 policy and doctrine, the linkages between knowledge, decisions, actions, effects and advantage, etc. These are reasons for the SA DOD to strongly consider the establishment of a KMC.

6.2.2.5 Risk Management

DODI42 (2, A-5, C2-2) states about risk within the context of risk management and more specifically about uncertainty – "Uncertainty is the state, even partial, of deficiency of information related to, understanding or knowledge of an event, its consequence, or likelihood.". The quotes use knowledge within the context of understanding or know-how, alluding to the fact that uncertainty is a result of a lack of knowledge/understanding of a particular event and its consequences. There is also some construct dissonance evident. These constructs are recognised within the same context by academia. Thus, KM should have a profound impact on the mitigation of uncertainty for the decision-makers.

DODI42 (A-8) states that stakeholder requirements and issues, as well as knowledge, drives risk perception. This sentence supports the relationship between knowledge and understanding that allows perceptions or meaning to be formed. Knowledge is thus important within organisations in order to manage risk and the perception of risk. If knowledge is not intentionally managed then organisations will probably attempt risk management that is based on information, which is risky in itself. To mitigate risk based on an incomplete picture or half-truth is equal to mitigating uncertainty with uncertainty. This said, the SA DOD is concentrating on the importance of IM to risk management. DODERMF1 (B-5) states that IM is a requirement for SA DOD risk management. DODI29 (A-1) states that information is important in the process of risk analysis.

DODERMF1 (B-5) states that the SA DOD must include IM in its estimate of organisational risk appetite and tolerance guidelines.

DODI42 (6) states – "Appropriate resources (human, financial, equipment, facilities and information technology) shall be assigned to the management of risks in such a way as to optimise value for money and respond to risks within acceptable norms, standards and boundaries.". DODI42 (A-6) states that risk analysis is the - "Systematic use of information to identify sources and to estimate the risk". Also, "Information can include historical data, theoretical analysis, informed opinions, and the concerns of stakeholders". Uncertainty is a constant for the SA DOD due to the complexity of the environment. It is thus paramount for the SA DOD and to the entire knowledge continuum to minimise uncertainty and risk, making a coherent and integrated SA DOD KMC of paramount importance.

6.2.3 Knowledge Continuum Artefacts that should be managed by the SA DOD?

Thus far all indications are that the SA DOD should seriously consider the establishment of a KMC based on SA DOD KM policy and doctrine to ensure coherent and integrated KM in the national interest. In order to draft future KM policy and doctrine the dissertation proposes definitions for knowledge and KM, a KM leadership philosophy and clear guidance on some of the leading indicators from literature and documents analysis promoting the adoption of the knowledge era and its associated constructs and practices which is important to SA DOD decision-making, actions, effects and advantage.

In order to provide structure within the extant SA DOD knowledge typology, the typology is divided into categories and types (or subject fields) of SA DOD knowledge. In order to establish an SA DOD KMC and coherent and integrated KM, the SA DOD must understand what categories and types of knowledge will require managing as part of the SA DOD knowledge typology. Without restating what has been said about possible categories of SA DOD knowledge by the dissertation thus far; the SA DOD manages capstone military knowledge such as policy, doctrine, intelligence and IP. This is also consistent with the findings of Chapter 4 of the dissertation.

Within these categories of capstone military knowledge, there are several types of knowledge or subject fields. A more detailed discussion from an SA DOD perspective follows, based on analysis of the selected sample SA DOD Level 1 policy and doctrine. Due to much construct dissonance (as discussed throughout Chapters 5 and 6 of the dissertation), the researcher lists all the relevant constructs and types identified in the selected sample of SA DOD Level 1 policy and doctrine to get a holistic view of the scope of the SA DOD knowledge continuum to be managed by a proposed KMC. Due to the fact that SA DOD Level 1 policy and doctrine mostly regard data and knowledge as part of information, the discussion is supplemented with a discussion of SA DOD data and information portfolio. It is also assumed that the existence of certain types of data and information presuppose knowledge on these. This provides the reader with a detailed view of the extent of the SA DOD knowledge continuum to be managed – just from the selected sample of SA DOD Level 1 policy and doctrine.

Table 6.4 at the end of this section provides an overview of the categories and types (subject fields) of different data, information and knowledge identified from the selected sample of SA DOD Level 1 policy and doctrine using the search criteria explained in the research methodology

(dissertation Chapter 4). The list (tables 6.4) is certain to expand considerably if all SA DOD policy and doctrine are considered. This is, however, outside the scope of this dissertation based on the research criteria set in chapter 4 of this dissertation. It does, however, highlight the requirement for research mapping the entire SA DOD knowledge continuum; possibly within the context of the IC framework. Such research will also provide valuable insight as to the readiness of the SA DOD for KM. The following two sections provide clarity about the significant amount of data, information and knowledge inherent in the SA DOD knowledge continuum and currently being managed by the SA DOD.

6.2.3.1 Typology: Categories of SA DOD Knowledge

The construct of wisdom is used in connection with the description of work (JDP13) and mentorship (JDP4). In another policy document, wisdom and doctrine are placed in perspective - "The development of sound doctrine is, therefore, as much to do with challenging received wisdom as it is codifying established practice" (JWP4: 3-1) This expresses recognition for the presence of wisdom and tacit knowledge when doctrine is crafted. Wisdom is thus included in the proposed SA DOD knowledge continuum. It is included in human capital as part of the IC construct. This requires an integrated approach to SA DOD KM in order to transform wisdom into explicit knowledge artefacts that would greatly enhance the SA DOD's prospects of achieving advantage. Integration is required because of the illusiveness of wisdom. Let us now discuss knowledge categories.

DODI14 makes a distinction between knowledge and experience (DODI14: 3). DODI14 (4), JDP14 (4-5), JDP15 (A-2). JDP20 (3) links levels or types of competence to knowledge as well as separating knowledge and skills in the following statement –

> "Foundational competence is the understanding of what the candidates are doing and why they are doing it, in other words what theoretical knowledge they have… Reflexive competence is the candidates' ability to integrate or connect their knowledge and skills so that they learn from their actions and are able to adapt to changes and unforeseen circumstances. … Applied competence is how the candidates put their knowledge into practice. Applied competence is the overarching term for foundational, practical and reflexive competence.".

From Appendix A to the study of Holliday and Chandler (1986) in Kakabadse, *et al*. (2003: 80) knowledge is associated with competence. Thus, there is a requirement for coherent and integrated SA DOD KM because of the dispersed nature of knowledge in the SA DOD in terms of human capital, structural capital and relational capital.

DODI1 (1A-12) identifies the requirement for SA DOD corporate communicators to have - "… knowledge of policies, regulations, procedures, channels of C2, as well as those factors both internally and externally that affect them.". This corresponds to SA DOD structural IC. SANDFP3 (14-3) calls for the use of innovative measures to be used to - "…develop and maintain the knowledge base [sic] for both matériel and doctrine". The wording does not pre-suppose an information-base or database. Over and above the functional knowledge relating to SA DOD matériel acquisition and management, a primary knowledge artefact stemming from the application of this type of structural knowledge is IP. Both doctrine and IP are regarded as capstone military knowledge because of their distinct influence on SA DOD advantage.

DODI26 (10) describes what is meant by "business knowledge". It is essentially the answers to the questions who should know and act, what should be done, when it should ideally be done and when should the effects be visible, where it should be done and ultimately where should the effects be felt, why the actions are important, and how should the actions be carried out to optimise the effects. This policy statement has important parallels with the rhyme ('who-what-where-when-how-which effects-what thereafter') as described throughout the dissertation in terms of granularity (see Figures 6.9a and 6.9b). Each element builds towards actionable pieces of knowledge about the past, current and future, enabling decisions, actions, effects and advantage. Thus, each fragment (data) provides increasing context, which as a whole, is considered knowledge. So knowledge at the corporate (or business level) of the SA DOD is not different from knowledge in military operations. Just the context and content varies.

DODI28 (A-2) provides a definition that links the construct of technology to a combination of elements, including knowledge. JDP4 (D3-3) states that doctrine, technology and people are interdependent. This is consistent with the view from the literature review of the dissertation that knowledge is linked to technology and people. JDP4 (D3-3) also clearly separates the constructs of knowledge, expertise, process and techniques in the definition of technology - "Technology. Any knowledge, expertise, process or technique which is developed, collected and used to create, use or maintain products and services to achieve a set goal. (RSA-Mil-Std 4: Acquisition Glossary).".

These constructs are all considered to be knowledge by the USA DOD (see discussion in dissertation Chapter 3). As previously stated in this chapter, it is not clear whether the SA DOD regards the construct of knowledge to be similar or inclusive. What is certain though is the fact that technology includes much knowledge continuum artefacts as stated by JDP4 above. What is problematic is when technology is regarded solely as knowledge and knowledge solely as technology. Figure 6.7 graphically articulating the components proposed to be part of the technology construct.

SANDFP3 (10-1) describes technology as involving - "… the use and application of knowledge (e.g. scientific, engineering, mathematical, language and historical), both formally and informally, to achieve some "practical" result", as well as - "Technology can also be defined as any knowledge, process or technique which, when used, will increase effectiveness to achieve a specific goal.". DODI23 guides the management of SA DOD IA and in particular refers to a defence technology knowledge-base (DODI23: 26). Research is undertaken by the SA DOD within the context of technology development to - "… gaining new scientific or technical knowledge and understanding" (DODI23: 38).

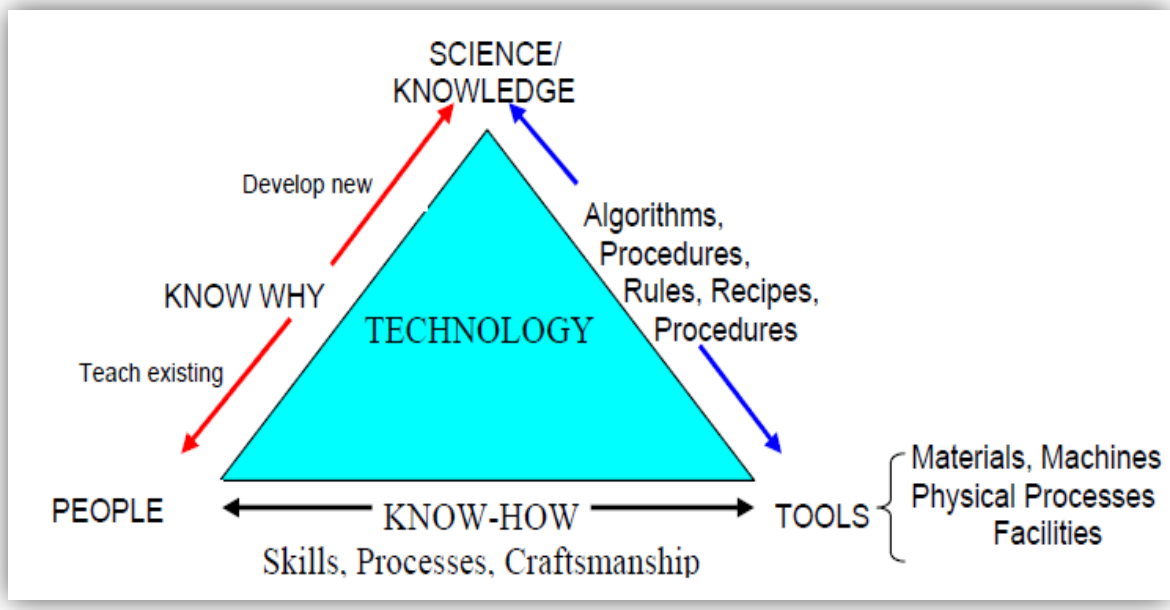


Figure 6.7: Technology Components Triangle

Source: SANDFP3 (10-2).

DODI40 (21) states the following about technology acquisition by the SA DOD, echoing the requirement stated by DODI23: 38 –

> "During [technology acquisition], technologies that will support the future needs of the SANDF weapon systems, are identified on a long-term prediction basis. Technology management is regarded as the activity of strategic planning, operational research, basic technology research (with no aim and not based on any existing knowledge), applied technology research (with specific aim and not based on existing knowledge), and experimental technology development (with specific aim and based on an existing knowledge base [*sic*]). The DOD technology acquisition is presently focussed on applied research and experimental development.".

This indicates the SA DOD's requirement for understanding the current technology and future technologies. "The technology focus should be on technologies essential to establish and maintain the Military Strategic Capabilities required to execute the Military Strategic Missions." (SANDFP3: 14-2 and 14-3). SANDFP3 (10-3) states a clear link between technology and - "Battle-space Effects". This is based on the Technology Triangle in Figure 6.7.

DODI23 (44) separates technology and knowledge as constructs. From the SA DOD's perspective and that of the researcher's, technology certainly embodies knowledge but does not consist solely of knowledge. These issues require robust definition within the SA DOD policy framework to avoid construct dissonance. When this is achieved the SA DOD might recognise the requirement for more policy and/or different policy. An SA DOD KMC will certainly provide coherence and integration to such initiatives.

What is potentially missing from Figure 6.7 above is the importance of relationships between people and between organisations in the form of relational capital. Science, engineering and technology thrive on clustered relationships that allow for knowledge sharing. Relationships and/or collaboration should be fitted between 'people' and science/knowledge' on the red side, above and

below 'know why'. Another thing that is problematic is the 'or' sign (/) between science and knowledge. Science is knowledge and knowledge stems more than often from science (even more so within the context of technology). Another construct missing at the top of the triangle is 'engineering'. The DR 2015 labels the capability to be established under the leadership of the Chief Defence Scientist as Defence Science, Engineering and Technology; the output of which is knowledge. All of this said, the SA DOD has a vast portfolio of science, engineering and technology knowledge, tacit and as knowledge artefacts, managed by its personnel and by stakeholders. Without coherence and integration with SA DOD structural capital (e.g. policy and doctrine), the SANDF will end up with science, engineering and technology solutions to required operational capabilities that do not fit doctrine and contradict policy. An SA DOD KMC could assist with integrating and optimising this predicament to the advantage of the SA DOD.

JDP4 (D3-9) states that knowledge facilitates insight that leads to understanding. This is captured in the proposed definitions adopted by the dissertation. JDP4 (D3-2) states that knowledge and understanding is a prerequisite for C2. The argument is expanded with doctrine and the "philosophy of command" posited as unifiers of understanding. It would also seem that command philosophy is different from doctrine and a distinct category of knowledge within militaries. Expanding this line of thinking, JDP4 (D4-4) separates the constructs of philosophy, policy and doctrine within the context of organisational culture development. JDP4 (D-5) states that the – "… emphasis placed on the application of philosophies of leadership, command and management, as well as the doctrines and practices from them, will vary considerably at each level of the organisational structure, as well as the particular circumstances prevailing at any one time.". These statements allude to a number of knowledge categories – philosophies of leadership, -command, – management, policy, doctrine and practice. It also confirms the time value of knowledge as discussed earlier in the chapter, providing a murmur that these must evolve to remain relevant. Philosophies are not just information and/or data. They are ostentatious and intricate explorations of phenomena in order to extract new meaning that might facilitate understanding Knowledge, such as doctrine and practice, stems from these philosophies according to JDP4, thus evolving into applied knowledge or structural capital.

Still, on the subject of philosophy, JDP4 (D2-2) and JDP4 (D2-13) states that the SA DOD uses management philosophy and doctrine, within the context of public service. Management philosophy is also mentioned in DODI26 (13) within the context of business process management – stating "… [business process management] must not only be an integral part of the [SA DOD] management philosophy but should also become part of the organisation culture". This can also be assumed to be part of business knowledge (DODI26: 10) as described above. JDP4 (D2-2) calls for the alignment of instructions (DODI), management philosophy and doctrine. A coherent and integrated SA DOD KMC could achieve this. Management philosophy is thus found in both SA DOD policy and doctrine and also seems separate from them. This kind of disparity can be harmonised by an SA DOD KMC.

JWP4 (1-3) states that doctrine development is perceived to be inextricably linked to history and is "… primarily developed to win the next conflict or war and is therefore forward-looking". An SA DOD KMC is also focussed on the next challenge, operation, battle or war. JWP4 (1-5 to 6) elaborates in detail on the SA DOD knowledge continuum and the symbiotic relationships between the constructs and also introduces 'capstone' as the measure for authoritative –

> "Within the realm of strategy there is always a complex relationship between doctrine and policy, with each having an influence on the other. Defence policy, representing South Africa's considered response to the strategic environment, is the principal source of direction for the [SANDF]. Policy is undoubtedly influenced by what is militarily possible (and in that sense is influenced by military strategic doctrine). However, military doctrine at all levels must be developed in a manner consistent with the demands of defence policy… Defence doctrine on the military strategic level has an important relationship with capstone defence policy. In contrast with the potentially fluid and changeable nature of policy, military strategic level doctrine is informed by fundamental lessons learned over time about ways in which the armed forces can be used effectively in support of policy. Doctrine is more enduring and less subject to change, although it is by no means rigid or inflexible. The hierarchy of military doctrine produced in South Africa is a guide to military commanders on the conducting of campaigns and operations and the tactical employment of the armed forces in support of national policy… South Africa's military strategy draws together defence policy (which must reflect the realities of the strategic environment) and military strategic doctrine (which provides guidance on the military means of support for policy …. An alternative way of expressing military strategy is to describe it as the bridge linking national policy and operational effect or performance. … Government's defence policy is articulated in the White Paper on Defence and the Defence Review.".

This policy statement identified reiterates the categories of SA DOD knowledge to be policy, doctrine and strategy. It provides a very considered view on the symbiotic tendencies of the capstone military knowledge. An SA DOD KMC is ideally suited to manage these symbiotic relationships for the SA DOD in its quest for new meaning, understanding and advantage.

Continuing with the discussion of the various SA DOD knowledge categories; IDODI1 (3) separates the constructs of doctrine and policy; DODI1 (4-9) separates doctrine, policy, strategy, orders and instructions and JWP1 (1-1 and 2) separates policy, strategy, orders, instructions, rules and procedures. These are all categories of SA DOD knowledge, albeit not all capstone. DODSPF1 (13) and SANDFP2 (1) state that there can be SA DOD policy about doctrine but that doctrine should not contradict SA DOD policy (SANDFO4: 1) and (SANDFD2: 1). SANDFD2 (1), SANDFO4 (1) and SANDFP2 (1) state that - "A policy is therefore required that sets out the guidelines for initiating, compiling, authorising, issuing, maintenance and controlling of all Joint Doctrine Publications". SANDFP2 (1) also states that - "Joint Doctrine must be compiled to expand on, and to be in accordance with, the Departmental Strategy drawn up by the [Sec Def] and with the overall military policy laid down by C SANDF.". This statement links doctrine inextricably to both policy and strategy at SA DOD Level 1 (i.e. Sec Def and C SANDF). Various types (subject fields) are found within the categories of knowledge, policy and doctrine are tabulated in Table 6.4.

JDP20 (10) states that doctrine is a distinct requirement for the development of military skill and knowledge-based competence. In support, JDP16 (D-4) states that doctrine is an ETD resource. JDP16 (B-3) states that policy and doctrine is an integral part of the SA DOD ETD system. JDP16 (C-1) states that policy and doctrine are part of the ETD value chain.

JWP4 (1-1) states - "Doctrine is not a set of rules, which can be applied without thought; it is, rather, a framework for understanding the nature of armed conflict and the use of military force. Its

purpose is to guide, explain and educate, and to provide the basis for further contemplation and informed debate. Doctrine teaches what to think and what to do, rather than how to think and how to prepare to do it.". These definitions support the linkages between understanding as knowledge, decisions, actions and effects. There are academics that equate knowledge to beliefs and/or concepts (amongst many other constructs), all part of organisational IC. DODI1 (4-9 and 4-10) states that when reviewing doctrine it must be ensured that all relevant information is included in doctrine – in order to construct this 'way of thinking'. DODI1 (4-9 and 1A-6) and JWP4 (1-2) link knowledge and doctrine and states that doctrine is - "… a common approach and way of thinking" -

> "Corp Com doctrine is to structure knowledge of Corp Com support to warfare, of the Corp Com aspect of warfare (which includes all tangible and nontangible outcomes of the practice of Corp Com, eg [*sic*] mutually beneficial relationships, a positive image, a good reputation and legitimacy) and of the Corp Com function in warfare. Sound Corp Com doctrine provides a common approach and way of thinking to Corp Com in operations, which is not bound by prescriptive rules (which can be found in Corp Com policy) (JWP 116)". DODI1 (1A-6)

JWP4 (1-2) states that the "… purpose of doctrine is to structure the knowledge of warfare". Doctrine is thus the instrument with which to structure knowledge. These policy statements allude to several elements of organisational IC and military effects to be achieved with doctrine. Doctrine is also positioned to structure knowledge and is therefore knowledge. A 'common approach' alludes to doctrines' ability to integrate action and thinking. JWP1 (1-1) defines doctrine, based on the South African Military Dictionary, as –

> "… fundamental principles by which military forces or elements thereof guide their actions in support of national objectives. It is authoritative, but requires judgement in application". This definition is accepted internationally and by the SANDF. Another definition given is an "explicit set of concepts according to which action in a given field is discussed and executed".".

JWP4 (1-1) quotes the DR 1998 (Chapter 2) in defining doctrine as – "… the main principles and concepts by which armed forces guide their actions in military operations in support of national objectives. Doctrine derives from, and must be consistent with, defence policy and posture.". A very similar definition can be found in DODI1 (1A-6), JWP4 (1-1 and 4-6), SANDFP2 (2), JWP1 (9-4) and SANDFP3 (15-10) – "… fundamental principles by which military forces guide their actions in support of objectives. It is authoritative, but requires judgement in application". Note that it does not include "national" before objective.

JWP4 (3-1) states that – "Doctrine is not merely a record of past practice; it is an assessment of the best approach based on a sound understanding of current imperatives and lessons learned from past experience". JWP4 (1-2) states that doctrine includes - "…intellectual, practical and dynamic, and predictive components.". JWP1 (1-20) also states that -

> "A sound understanding of an organisation's doctrine, which comes firstly with the insight gained, for example, in the initial training and/or orientation received on joining the organisation, and later from experience achieved simply by working within the organisation and absorbing its culture, enhances the understanding of strategy and policy and should be sufficient to guide any element of that organisation, down to the individual responsible for planning and executing activities, to a reasonable chance of success in any endeavour of the organisation, even in the absence of any other policy, guidelines, orders or instructions.".

These opinions again reiterate the symbiotic nature of the interaction between insight, intellect, experience, understanding and doctrine. This interaction assists with prediction and projection and provides the knowledge with which the next challenge, operation, battle or war will be fought with.

DODI40 (24) defines a system as – "A system is a combination of mutually dependent items, assemblies, skills, techniques, doctrines, or anything that can play and/or support an operational role in the intended environment". This supports the idea proposed by corporate communication that doctrine is part of a user or product system. What is interesting is that knowledge is not stated as part of a system. Other capstone military knowledge missing from the definition is IP, especially because the context of the policy is the acquisition of such knowledge and other hardware, as well as policy.

The researcher steps away from doctrine as a category of capstone SA DOD knowledge to discuss other categories of SA DOD capstone knowledge. DODI23 provides policy on the management of SA DOD IA. In general, DODI23 outlines all the matters concerning the management of SA DOD IP with regard to legislative -, accounting - and contracting aspects.

DODI23 uses the constructs of 'knowledge" and 'IP' in the same context but does not include 'knowledge' as a construct in the definition of IP. DODI23 (A-3) defines SA DOD IP as –

> "… any creation of the mind that is capable of being protected by law from use by any other person, whether in terms of South African law or foreign law, and includes any rights in such creation, but excludes copyright in a study, dissertation, article, handbook or any other publication which, in the ordinary course of business, is associated with conventional academic work".

The SA DOD thus manages a specific IP portfolio with DODI23, leaving a significant portfolio of IP possibly unmanaged (the second part of the definition). The silo approach to KM is quite evident as previously discussed and highlights the requirement for coherence and integration.

In contradiction, DODI57 (B-9) defines IP as "… Concepts, ideas, planning documents, designs, formulas, processes and other information-based materials intended for products or services that have some commercial value or represent original thoughts or theses. It is thus an intangible asset.". Contradictions such as these have been highlighted earlier in this chapter as construct dissonance. In this case, it could possibly lead to management dissonance and a loss of advantage, especially when original thoughts are not properly codified, controlled and managed because it is excluded by the DODI23 definition or does not seem to have commercial value as in the second definition. It is more than often original thought that unlocks advantage or secures a specific effect.

DODI50 (13) equates trade secrets to information. Trade secrets normally relate to IP, which is considered knowledge. It is a clear case of dissonance (information being regarded as inclusive of data and knowledge) with ramifications for the management of the knowledge being kept secret. Trade secrets also indicate the importance of knowledge security or the security of the knowledge continuum. Various types (subject fields) found within the constructs of data, information and knowledge are tabulated in Table 6.4.

SA DOD capabilities and resources have been discussed at length earlier in the dissertation, specifically relating to POSTEDFILT(B) The researcher of the dissertation proposed earlier that this understanding of capabilities is probably due for revision in order to align it and others with the requirements of the knowledge era. Several SA DODI policy and doctrine link POSTEDFILT(B) to capability and action (DODI1: 1A-3, 1A-22, 4-23, 7B-2; DODI26: A-1; JWP1: 8-1, 9-1, 9-7; SANDFO2: 2-1, A-1 and JWP4: 6-1). POSTEDFIT includes doctrine and information, and exclude IP and intelligence. However, in contradiction, DODI40 does not make mention of information, but rather intelligence and doctrine. DODI40 (26) states that doctrine is part of an SANDF user system but not a product system. Interestingly IP is not cited as part of either of the two. DODI57 (B-14) states that doctrine is part of a "user system". DODI40 (24-25) describes doctrine and intelligence, as part of a user system, and in terms of POSTEDFIT. Both doctrine and intelligence are thus characterised as capstone military knowledge managed by the SA DOD.

Let us now consider some of the knowledge continuum artefacts, as articulated by the selected sample of SA DOD policy and strategy, and perceived as types of data, information and knowledge. These typically relate to a vast array of subject matter currently being managed by the SA DOD with IM methodologies. It provides a clear picture of the requirement for coherence and integration, as proposed throughout the dissertation by the researcher, to be achieved by the establishment of an SA DOD KMC and institutionalisation of KM as policy and doctrine.

6.2.3.2 Typology: Types (Subject Fields) of SA DOD Knowledge

The following tabulated list represents types (subject fields) of knowledge found in the selected sample of SA DOD Level 1 policy and doctrine. The table is in support of the stated requirement for coherent and integrated SA DOD KM, providing evidence of the vast portfolio and sheer variance in the subject matter currently inherent in the SA DOD. Table 6.4 does not represent a finite list of subject fields within the SA DOD knowledge continuum but is a reflection based on the search words used as described in Chapter 4 of the dissertation and in Chapter 5. This list will expand if the entire volume of SA DOD policy and doctrine are considered and scrutinised as part of an SA DOD knowledge readiness audit or any related research.

Table 6.4: Categories and Types of SA DOD Data, Information and Knowledge

Constructs and Categories	Type (subject field)
Knowledge	contextual work place-, applied-, enterprise risk management-, corporate communication-, general knowledge of the SA DOD, stakeholder-, HRM related -, defence technology knowledge-base, scientific-, technical-, business process management-, ethics and moral knowledge, PFMA-,RSA Military Standards, treasury regulations and the Institute for Internal Auditing Standards, practical audit implementation methodologies-, practical implementation of investigation methodologies-, ergonomics science-, threats to munitions-, knowledge of the role of the different role-players within the "peace building" process, knowledge of the organisational structure, processes, functions and records systems of the SA DOD; records management practices-, relevant records management and archival standards-, acquisition-, risk management-, principles on service delivery innovations-, vulnerability assessments-, best practices and procedures for wireless device configurations and connections-, eligible members-, dependants and other approved clientele-, career development -, theoretical, indigenous and specialized-, chain of command-, unit standards-, knowledge of the different opportunities for collecting

	evidence and how candidates with special assessment requirements are given access, essential embedded knowledge (principles of assessment, principles and practices of Recognition of Prior Learning, methods for gathering evidence, potential barriers to assessment, feedback techniques, assessment policies; specialist-, psychological-, knowledge relating to ethical and professional behaviour of psychologists, professional-, nutritional-, unit standard or qualification-, subject matter-, basic service rights-, specific-, knowledge and understanding of the SA DOD, functional-, existing-, new-, past, present and expected-, extended-, essential-, command and control-, professional-, multi-cultural issues-, general knowledge, job-, practical expert-, aviation safety-, knowledge of the susceptibility of the aircraft, its crew, equipment, weapons and ammunition to the hazards of electromagnetic radiation, principles of flight-, communication-, warfare-, stakeholders and stakeholder groups-, enemy's most probable course of action-, knowledge of policies, regulations, procedures, channels of command and control as well as those factors both internally and externally that affect them, broad spectrum of knowledge, professional-, knowledge of the role of the different role-players within the "peace building" process, knowledge of the crisis region and the local people, in depth -, particularly of regional actors and the diplomatic scene. In addition, many of those selected will be proficient linguists with an understanding of the local culture, knowledge of local contractor facilities, SAMHS-, logistic knowledge at both national and multinational levels, basic knowledge of mathematics, science, technical/mechanical fields, computers, characteristics of the battlespace, knowledge of the future (i.e., to know what will be), but only to have knowledge about factors shaping the future….and their possible consequences for the future, conventional-, mission essential-, knowledgeable buyer of military armament, knowledgeable users, knowledgeable managers of defence capabilities and knowledgeable maintainers of our capabilities, business enterprise knowledge	
Knowledge References	IDODI1, DODERF1, JWP1, DODI1, DODI9, DODI10, DODI11, DODI14, DODI23, DODI25, DODI26, DODI27, DODI28, DODI29, DODI33, DODI40, DODI42, DODI43, DODI57, DODI58, JDP13, JDP14, JDP1, DODI56, JDP12, JDP20, JDP3, JDP4, JWM1, JWP1, JWP4, JWP8, SANDFO2, SANDFP3	
Intelligence	strategic-, technical-, operational-, tactical, imagery-, country specific-, situation specific-, health-, criminal-, human-, trans-national activities-, electronic-, signal-, command intelligence	
Intelligence References	DODI31, DODI46, DODI50, DODI58, JDP1, JWP8, SANDFP2, SANDFP3	
Doctrine	corporate communications-, logistics-, chemical and biological weapons and radioactive materials -, matériel, management-, command-, operational-, service-, mission command as doctrine, doctrine for helicopters, airforce-, doctrine for amphibious operations, North Atlantic Treaty Organisational tactical air doctrine, doctrine for airspace control in times of crisis and war, United Nations and United Nations public information doctrine, South African Development Community-, warfighting-, SA DOD command-, SANDF doctrine on psychological warfare, fire and rescue service operational -, SANDF operational-, African Union deployment-, Southern African Development Community deployment-, SANDF deployment-, South African Military Assistance and Training Teams (SAMATT)-, employment-, joint-, interim-, joint warfare-, operational-, multinational operations-, common-, defence posture doctrine	
Doctrine References	DODI1, DODI31, DODI33, DODI40, JWP1, SANDFP3, JDP4, JWM1, JWP1, SANDFO2, SANDFO4, JWP4, SANDFO4, SANDFD2, JWP4	
IP	defence matériel related-, Software related-, Source code, Front-end Source Code, Rear-end Source Code, Ergonomics-, knowledge, research information, strategic personnel and job profiles, Defence ergonomics best practices and analysed operational data, RSA Defence ergonomics information (RSA-Mil-Documents),	
IP References	DODI23, DODI24, DODI28, DODI57	
Other	philosophies of leadership, command	JDP4 (D-5) JDP4 (D2-2), JDP4 (D2-13)

	and management	DODI26 (13)
Information	management-, defence-, health-, risk-, Public Service Act Personnel leave management-, medical-, career-, contract-, ETD-, receipt or giving of official donations or sponsorships-, debt-, vehicle accident report-, organisational address-, geographical-, IP ownership-, electronic-, supplier-, software-, software licence-, network-, staff visit-, business-, organisation-, behaviour-, qualitative-, information about activities, business objects involved, resources, timing, business rules, policies, and constraints governing the process, project progress-, verbatim-, relevant-, financial-, operating-, ergonomics-, munition safety-, classified-, CI-related-, Defence Community-, Instructions, orders, guidelines, bulletins, news clippings, calendars, contact details, structures, forms, manuals, acquisition management-, background-, project management-, acquisition documentation-, tender-, factual-, internal audit findings-, Public-Private Partnerships project-, aerial photography-, performance-, pertinent-, guest speaker-, defence foreign relations-, military installations, buildings or structures which house, sensitive equipment and/or operational sensitive processes, methods, techniques, procedures or guidelines used during an investigation concerning the detection, curtailment or investigation of a matter if such disclosure can impede the prosecution process, trade secrets, financial, commercial, scientific or technical, evaluative material supplied, tactical manuals, examination, test, auditing procedure, Foreign government-, country- or situation-specific intelligence assessments and appreciations, Intelligence sources and Counter- Intelligence activities, Operational and contingency scenarios, plans and measures, operational and tactical capabilities and strengths of a formation or the SA DOD, performance, capabilities, technical specifications and serviceability of SA DOD equipment, Technical information on communications, cryptography and electronic warfare capabilities and equipment, research, development and acquisition projects, details on technology development programmes, personal privacy of SA DOD personnel, incident-, gift register-, learner assessment-, demographic-, learner-, resettlement management-, Managing Programme Performance-, payment-, telegraphic transfer-, foreign payments , budgets, expenditure and revenue, planning-, service delivery-, organisation-, job evaluation-, remuneration-, benefits-, personnel expenditure-, the utilisation of consultants-, affirmative recruitment-, promotions-, termination of services-, performance management-, skills development, injury on duty-, labour relations-, leave and discharge due to ill-health-, clinical-, learner-, disability-related-, youth related-, written-, spoken-, computerised-, private-, career-, Recognition of Prior Learning opportunities/ services and programmes, assessment-, donor-, sponsorship-, legally privileged, frequency-, track-, situational awareness-, battlespace-, tactical-, battlefield related-, tactical image-, tactical text-, battlefield awareness-, aeronautical-, target-, position-, range-, IFF/SSR-, heading-, helicopter operations related-, false-, terrain information	
Information References	DODD2, DODD13, DODERMF1, DODI11, DODI15, DODI16, DODI17, DODI21, DODI22, DODI23, DODI24, DODI25, DODI26, DODI27, DODI28, DODI29, DODI32, DODI38, DODI39, DODI40, DODI41, DODI42, DODI43, DODI45, DODI46, DODI48, DODI49, DODI50, DODI51, DODI53, DODI55, DODI56, DODI59, DODSPF1, FMDI1, IDODI2, JDP1, JDP3, JDP4, JDP13, JDP14, JDP17, SANDFO1, SANDFO3, JWM1, SANDFP1, JWP1, SANDFP3	
Data	numerical-, corporate communication environment-, historical-, performance-, descriptive-, Content Management System (CMS)-, Cell phone numbers-, off-strength-, technical-, logistics-, human resource-, debtors-, financial-, electronic-, accounting-, software-, ICT asset-, command and control-, ergonomics (anthropometry, controls, human performance, human computer interaction, displays, biomechanical forces, physiology and environmental influences, psychological and Occupational Health and Safety-, raw-, analysed-, standardisation-, project-, task analysis-, munitions-, supplier-, statistical-, demand/dues-in no, manufacturing data pack, historical cost-, serial number specification-, strategic/political-, planning-, engineering-, acquisition phase-, LSAR, -life cycle cost-, procedural-, system pass-, classified-, transactional-, operational baseline-, integrate logistics support-, customer furnished equipment-, codification-, disability- , Senior	

	Management Service-, skills-, geospatial-, areal imagery-, reconciliation-, simulated-, patients-, transmission-, geographic-, manufacturing-, system-, clinical-, human resource related-, learner achievement-, learner-, biographic-, target group profile-, disability desegregated, aircraft accident and incident-, radar-, research-, Aircraft Radiation Hazard Designators-, Transmitter Radiation Hazard Designators-, operating envelope-, briefing-, emergency-, separation/exit of members and employees -, tidal and related meteorological data
Data References	DODI1, DODI2, DODI4, DODI21, DODI23, DODI24, DODI26, DODI28, DODI29, DODI32, DODI35, DODI38, DODI40, DODI43, DODI57, DODI58, DODI60, DODI61, FMDI1, IDODI2, JDP13, JDP3, JDP4, JWM1, JWP1, JWP3, JWP4, SANDFP3

It is fundamental for any organisation to know what the extent of it is to be able to comprehend how to manage it. More so if that organisation is a public service organisation accountable to the taxpayer. Contributing to the arguments already forwarded by the researcher of this dissertation; the sections above dealing with categories and types of SA DOD knowledge serve to answer SRQ3 and certainly inform questions raised by the other secondary research questions. Some of the fundamentals relating to how to manage knowledge in the SA DOD will now be reflected on in this last section of Chapter 6 of this dissertation. This will be followed by a proposal of an SA DOD KM model that draws the fundamental components and arguments together into a graphic illustration of a future SA DOD KMC.

6.2.4 Fundamentals of SA DOD Knowledge Management?

Considering the arguments and the identification of the vast portfolio of SA DOD knowledge above it is clear that a paradigm shift is required towards a coherent and integrated KM and the establishment of an SA DOD KMC. Based on insight gained thus far from this and other chapters of the dissertation, the following discussion will reflect on some fundamentals for a future SA DOD KMC and coherent and integrated KM.

6.2.4.1 Security

Knowledge security is not very prominent in literature. From discussions in Chapter 3 of the dissertation, data, information and knowledge security are a critical requirement for militaries; a principle of war. There are several and varied requirements for the security of knowledge continuum artefacts detailed in Chapter 5 (SA legislation and DR 2015) and the selected sample of SA DOD Level 1 policy and doctrine discussed in this chapter. With foreknowledge of what categories and types of knowledge the SA DOD actively manage, let us discuss some of the statements that speak to the security of these knowledge continuum artefacts. A particular caveat important to mention again at this point is that the SA DOD regards (mostly) information as inclusive of data and knowledge. It will also be tempting to quote the entire SA DOD information security policy (DODI50), however, this will probably result in the exploration of issues that is outside the scope of the dissertation.

DODI50 (5) alludes to the "secrecy dilemma" linking information to national interests - "Secrecy is vital to the functioning of government in an uncertain world. Its purpose is to prevent the access of adversaries to information that could be used against the interests of the state, its people or allies - in short, to protect national security, to enable effective diplomacy, to save lives, and to bring criminals to justice.". Another part of DODI50 (5) describes the secrecy dilemma. It

provides some important calibration to the requirement for information security in five broad categories; information regarding –

> "… Defence and the Security of the RSA, including information regarding military operations and weapons technology. … International relations, including diplomatic information. … [relating to] law enforcement, including activities associated with such. … [relevant to] the economic interests and financial welfare of the RSA, including information regarding the commercial activities of public bodies. … [and] … pertaining to personal privacy".

DODI50 (5) states -

> "Not all information in the above categories need, or should be protected and it should not be used to protect government officials, or agencies, from public scrutiny, accountability or censure. In this regard, the MISS stipulates that security measures are not intended to and should not be used to cover up maladministration, corruption, criminal actions etc., or to protect individuals or officials involved in such cases. On the contrary, access to information is essential if policy makers [*sic*] are to be fully informed, if government is to be held accountable for its actions, and if the public is to engage in informed debate. Access to information is also vital to stimulate discussion, to enable criticism and to stimulate scientific and technological development. Transparency therefore enhances security by reducing the risk of the abuse of power and by enabling the dissemination of knowledge that is essential for development. The dilemma is to effectively protect information that should be kept secret, while disclosing or allowing access to that which is necessary for good government and the enhancement of participation in decision making.".

These statements describe the adversarial nexus between knowing and its prevention. For the SA DOD, as with all militaries, adequate distribution of knowledge continuum artefacts to be able to generate new decision-quality knowledge and understanding that will enhance decision-making and action, enabling precise effects and advantage is a fundamental requirement. Knowledge continuum security is fundamental to a future SA DOD KMC and a managed adversarial nexus between freedoms to share and legislated to restrict knowledge flow and usage. DODI50 details the SA DOD Level 1 policy on information security and access as follows -

> "The question of public access to defense [*sic*] information in a democracy in a time of peace is inevitably characterized by a tension between the imperatives of transparency and accountability on the one hand, and the legitimate need to preserve the confidentiality and secrecy of certain information on the other. The advent of democracy in South Africa has brought about a level of openness about defence matters that is in stark contrast to the secrecy of the past. The change has however created uncertainty about which information should routinely be available to the public." (DODI50: 1).

The requirement for access to information as expressed by DODI50 relating to the Constitution and PAIA is discussed in Chapter 5 of the dissertation. Neither the Constitution nor PAIA defines the construct information. DODD4 (2) states that the PAIA provides for the constitutional right of access to State held information - "… that is required for the exercise or protection of any right". No mention is made to access to State knowledge within this context. If it is assumed that knowledge is excluded from this legislation, it would typically exclude policy,

doctrine, intelligence and IP as capstone types of military knowledge from this security provision as well as having to provide access to SA DOD knowledge. DODI50 (7-8) states that -

> "According to the PAIA, access to defence and security information may be denied in terms of Section 41, if its disclosure could reasonably be expected to influence the defence or security of South Africa if it would reveal information regarding…
>
> d. intelligence held for the purpose of the defence of the RSA, or for the detection, prevention, suppression or curtailment of subversive or hostile activities;
>
> e. methods, and scientific or technical equipment for collecting, assessing or handling of such intelligence information; and
>
> f. the identity of a confidential source or any other source of information concerning the collection of intelligence.".

The statement clearly separates the constructs information and intelligence. The statement seeks the protection of information about intelligence and its collection. It does not seek the protection of the intelligence itself, which is problematic. This problem could probably be attributed to construct dissonance and the correct usage of the constructs information and intelligence. The researcher is of the opinion that both information and intelligence should have been clearly delineated in the statement above and the separate security requirements explicitly stated.

DODI50 (11) deals with information security and equates doctrine to information based on the requirements of the Constitution and the PAIA. Discussion in Chapter 3 of the dissertation has a different view. Doctrine is regarded as capstone military knowledge. Neither the Constitution nor the PAIA makes mention of disclosure of knowledge, just the requirement for the disclosure of information is legislated. Thus, if the SA DOD properly classifies what it considers to be knowledge, the organisation might drastically change what can be disclosed as information according to the PAIA. In this sense, just due to proper definitions of military knowledge, enhanced security of knowledge could be achieved. JWP1 (3-5) states the nexus as follows from a corporate communications' perspective –

> "Provision of information must be in accordance with [SA DOD] Corp Com policy and must balance security concerns with the obligation of openness, transparency and of keeping the public informed of [SA DOD] matters. Classified information must be handled according to security policy".

DODI46 (1, 6 and 9) reiterates the necessity for security regarding aerial imagery and provides a practical inclusion of the requirement to mitigate the secrecy dilemma as much as possible –

> "For security reasons the collection, distribution and possession of aerial imagery of defence installations and national key points, like other defence information, is subject to restriction, as enabled by inter alia the Defence Act …, the National Key Points Act … and the Protection of Information Act". Other legislation that is important in this regard are [*sic*] the Promotion of Access to Information Act, as amended, the Constitution of the RSA, the Land Survey Act … and the Air Information Publications ... The need to protect information must, however, be balanced against the constitutional right to information and its expression in the Promotion of

> Access to Information Act … The [SA DOD] policy on aerial photography should therefore strive to balance the requirement for security with the right of access to information and what is openly available.".

Security is not only based on the requirements of the Defence Act but on other national legislation in parallel. The SA DOD knowledge continuum security is based on an integrated national imperative. No mention is made of knowledge in these quotes. This is probably based on the notion that the SA DOD regards information as knowledge and vice a versa, which is problematic from several perspectives – resource management, security and decision-making – to name just three. Transparency and sharing are critical to the management of information and knowledge, security and the for a balanced security nexus that facilitates trust building and knowing. The statement above reflects an improvement in the adversarial nexus. It is from this perspective that SA DOD information security is currently being managed.

SANDFP4 (L-1) states that classified information is – "… any information which is held by or for, is produced in or for, or is under the control of the State or which concerns the State and which must, for the sake of national security, be exempted from disclosure and must enjoy protection against compromise". DODI50 (A-1) defines sensitive information as that which – "… may be protected from unauthorised disclosure in order to prevent the national interests of the Republic from being endangered.". Both these quotes state the requirement for information security, and by implication also data and knowledge security, against the requirement for national security and interest protection. Therefore, national security and interests are linked to KM from a security perspective, but probably also others such as innovation and asset management.

"Security involves the defence of high value [sic] assets and information that are vital to the nation's armed forces. A sufficient degree of security is essential in order to obtain freedom of action to launch an offensive in pursuit of the aim. This could imply that risks are to be taken in order to surprise the enemy and gain a favourable situation". (JWP4: 3-6)

One can assume that capstone military knowledge (e.g. doctrine, intelligence and IP) is included in 'high-value assets' because these are military assets clearly linked to military advantage. However, the assumption is not supported explicitly by JWP4 or elsewhere in SA DOD policy and doctrine as have been discussed thus far in this chapter. The researcher of the dissertation considers this a considerable gap in policy and doctrine, which could be corrected with clear policy and doctrine on what is considered SA DOD resources and assets. A future SA DOD KMC should be positioned to express on this in policy and doctrine and manage the evolution of this policy and doctrinal position. A high premium is also placed on security for decision, action, effects and advantage – all-inclusive in the military concept 'freedom of action', 'surprise' and 'gaining a favourable situation'.

DODI50 (5) also describes the dilemma of the cost associated with classifying information. Unnecessary classification or typically over classification leads to wastage due to the management requirements associated with classified information. This also relates to de-classification of information. There is thus a distinct argument for a pragmatic and practical information classification system in order to maintain information security without unnecessary wastage, stated as follows –

> "… uncontrolled proliferation of classified material results in a lack of discrimination, a shortage and waste of resources, and the devaluation and degradation of the entire classification system, which makes it difficult to adequately protect or control that which truly requires protection. Other intangible costs of excessive classification are: … It limits the opportunity for input, review and criticism, thereby undermining well-informed judgement and perpetuating entrenched, outmoded beliefs and ways of thinking. … It prevents the sharing of technological and scientific information, stifling discussion, retarding development and leading to the duplication of effort. … It leaves the public uninformed about important decisions and prevents public participation in decision-making processes. … It enables and encourages the monopolisation of information to enhance political or bureaucratic power. … It increases the risk and probability of inadvertent or deliberate leaks. … There are thus excellent grounds for maximising access to information while at the same time protecting that information justifiably requiring protection. This interaction between the need for access to information and the need to protect other information is reflected in the Constitution and the Promotion of Access to Information Act. " (DODI50: 6)

This again highlights the secrecy dilemma. The policy statement also echoes the requirement for SA DOD capstone knowledge to be adequately protected as previously stated. This protection should always be balanced against the need for public trust, resource availability (funding, etc), knowing and the need to know. Literature primarily only discusses the need for sharing knowledge and largely ignores the requirement for protection (not sharing or sharing selectively). By adequately protecting knowledge, advantage is also protected. By overprotecting knowledge, advantage might be lost due to access being restricted that will hamper innovation, decision-making and action (amongst others). This is the dilemma that should be managed between the future SA DOD KMC and the DI.

IDODI2 (21) states a particular requirement for information security as follows – "There has also been a consistent inclination towards the provision of the performance information in separate documents for the two constitutional institutions, namely, the Defence Secretariat and the SANDF, due to the requirement by the Executive Authority to protect sensitive departmental performance information". This statement just confirms that the SA DOD information security regime is applicable to both the Sec Def and CSANDF.

DODI 30 (3 and 8) states importantly that it is the duty of the MOD, Sec Def, SA DOD senior command and ARMSCOR Chief Executive Officer, under the supervision of C DI, to ensure classified information security policy and procedures are adhered to by all SA DOD personnel. This statement thus confirms the roles of Sec Def and C SANDF but also expresses on the wider responsibility towards SA DOD knowledge continuum security.

DODI9 (5) states that C DI is responsible for information security as well as the definition of SA DOD security requirements, responsibilities, and control mechanisms to be applied to information in order to ensure and maintain its availability, integrity and confidentiality. DODI50 (2) states that "[C DI] shall be ultimately responsible for the authorisation of requests to release classified information". This position is echoed by every SA DOD Level 1 policy and doctrine that express on information security (for example DODI23: 8). There is also calls for knowledge security, e.g. DODI46 (3) stating the requirement for policy on and the security of imagery

intelligence for which DI is responsible. C DI is under the command of CSANDF, one of the components named in the previous paragraph. C DI is also then correctly identified by policy to be responsible for the management of the secrecy dilemma. C DI should in future be assisted in the management of the secrecy dilemma by an SA DOD KMC, as stated above. This championship will be discussed later in the chapter.

DODD10, DODD15 (2) and DODI24 state that the security of information and communication systems are essential. Information and communication systems security and related software security are stated by most of the selected sample of SA DOD Level 1 policies and doctrine. This relates more to the security of the hardware components of these systems and software. However, the security of the content managed by the systems are implied but also stated in other policy and doctrine.

SANDFP3 (6-6) asks about one of the persisting uncertainties facing South Africa - "Will the effect of innovations in [IT] affect [IM] within the [SA DOD], inclusive of information security?" This can be answered positively. Small innovations such as cloud computing and storage are cases in point. This introduces another dilemma for the SA DOD to manage – how to embrace innovation and technological change with maximum effect without negatively affecting knowledge continuum security? In the discussion to follow, it is very evident that data and information security are addressed exhaustively with the criticality thereof placed in the spotlight. DODI50 (8) states the legislative requirement regarding data security. SANDFP3 (10-2 and 10-5) states the following with regard to perceived uniqueness and the requirement for data protection -

> "The [SANDF] is actively initiating and exploiting new and enabling technologies and contributes to the identification or development of future defence related technologies across the spectrum of potential threats. The [SA DOD] requirements and contributions to science and technology are fully aligned with the Governments National Science Initiative and the protection of its data, due to the unique nature of the military, is guaranteed".

This highlights the importance of SA DOD data due to the unique nature of the military and its relationship with other governmental stakeholders. Within the context of the selected sample of SA DOD policy and doctrine, there is, therefore, acknowledgement of the security requirement for military knowledge (if knowledge is understood to be technology). It is, however, important for each building block of the knowledge continuum to be secure in order to have a secure knowledge continuum. It would thus be very helpful to have policy and doctrine expression on knowledge continuum security which would then express the desired level of security for data, information, knowledge and wisdom as an inclusive concept, once the dissonance amongst the various constructs have been cleared with the introduction of an authoritative taxonomy.

Continuing the discussion of data security requirements, DODI30 (3-10, 3-15, B1-2 and C1-1) and DODI39 (E-3) explain the security requirement for stored SA DOD data and databases. DODI57 (2-3) states the following about SA DOD data security requirements for information systems design in terms of confidentiality and flow control -

> "Provision shall be made for [SA DOD] approved security mechanisms during the design phase of secret and top secret [*sic*] systems to ensure the confidentiality of data (for example encryption). … The system shall be designed in such a way that the various components (for

example transaction modules, software, operating system interfaces and databases) can exercise full control over the data or capabilities they share among them.".

DODI40 (M12-5) states -"Classified data shall be identified, controlled, stored, distributed and destroyed in a secure manner. All transmitted data shall be protected against disruption and unauthorised access". The statement makes mention of more detailed processes required for the management of the knowledge continuum and security. At the very basic level, the statement expresses the need to manage the knowledge continuum without which the security of the continuum will probably become very difficult.

DODI30 (5) states that - "All classified knowledge/information which can be recorded or transmitted by any means, is safeguarded against compromise, loss or destruction". DODI24 (35) highlights the importance of data security during data transfer whilst updating or disposing of software. This security is probably inclusive of integrity management. DODI28 (9, 15 and 18) and DODI48 (15) call for data and information integrity and security. Thus, security of the knowledge continuum has at least two components, the security of the content from an integrity perspective and the security of the content from a loss or compromise perspective. Both these have serious consequences for decision-making, action, advantage and innovation.

DODI60 (5) expresses on data security for communication by email – "Only data where the content is classified up to and including "Confidential" may be transmitted via e-mail. No information classified secret or top secret shall be sent via DOD E-mail System unless authorised by the appropriate authority.". DODI60 (6) states that - "Any official without a valid [DI] issued confidential security clearance classification shall not be allowed to use [SA DOD] e-mail system.". This makes the use of SA DOD specific communications systems such as the email system exclusive. This should not hamper the communication of data, information or knowledge within the SA DOD, but might hamper communication with other stakeholders and role-players. These policy statements provide a glimpse of the security requirement for KM processes such as knowledge sharing, both for voice communication and electronic communication. Encryption is thus a very important KM tool from the perspective of security and integrity to ensure advantage is not lost.

DODI57 (4-1, 5-2, 6-4 and 7-1) discusses the requirement for SA DOD database security, also mentioned in other policies. No mention is made of securing SA DOD knowledge-bases. DODI28 (2 and 19), for example, states that the SA DOD must - "… provide for an adequate and sustainable knowledge-base to access ergonomics information and databases on a continuous basis".)

DODI57 (1-5) makes mention of the criticality of disaster recovery plans for data. As it should, this indicates that the SA DOD regards data to be very important — data being a critical building block in the construction of knowledge. It also indicates that it is a systems approach. It should not just be protection against a loss of data but extend beyond that to be able to recover such losses if it occurred. Knowledge continuum security should thus ensure the protection of the entire value chain of SA DOD knowledge.

DODI30 explains the notion of SA DOD information security within the context of counterintelligence, in other words, the security effort and tradecraft required to prevent SA DOD

classified information from falling into the hands of the adversary due to negligence or espionage[84]. With the risk of having to quote the entire DODI on the importance of information security, the researcher took a different tack and analysed what is not said. DODI30 does not address knowledge security, intelligence security, doctrine security and IP security explicitly. Instead, and in line with legislation, it addresses information security. These are all possibly inclusive in information security based on the definition of SA DOD information. In fact, DODI30 (2) states the importance of information, personnel, infrastructure and matériel assets are of critical importance to the SA DOD. DODI 30 (5-8) states that information is - "… considered a strategic resource in the [SA DOD] as it forms the basis for decision-making and effective management. It is therefore of utmost importance that the provisions of the different areas of security as contained in this policy be executed.". That may be so, but one would have expected that line to read - of information and knowledge (inclusive of intelligence, doctrine, IP), personnel, infrastructure and matériel assets are of critical importance for decision-making and strategic assets to the SA DOD. This is only briefly alluded to under auditable outcomes (DODI30: 5) that both for knowledge and information needs protection.

DODI30 (2-1) deals with information security extensively and knowledge security very briefly. The real problem with DODI30 is in the definition provided for information, i.e. – "Information is any knowledge", rendering the overall requirement found in several other policy and doctrine also for information security and not knowledge security.

DODI30 (A-1) defines acts that endanger security as - "Any form of behaviour, activity or omission within own ranks, which exposes own forces information, plans, operations, human resources, infrastructure, installations, equipment or any other resource to exploitation by an adversary to the detriment of the State or any agency of the State.". It again fails to acknowledge the fact that military knowledge (intelligence, doctrine and IP), if exploited by an adversary, would have a much greater impact on own force advantage. This policy phrasing is the result of information era thinking and construct dissonance. It is for this purpose that the researcher proposed a review of SA DOD military concepts to bring them in line with knowledge era thinking. The definition also does not include the possibility that own forces security might be compromised when any of the named components above of an allied force(s) are endangered.

DODI50 (5) identifies five broad SA DOD information security categories. One of these worth noting is - "Information regarding Defence and the Security of the RSA, including information regarding military operations and weapons technology". DODI50 makes it clear that not all information needs protection and that it is in the interest of the government to allow access to information as much as possible; alluding to the secrecy dilemma previously discussed. Knowledge security is a critical requirement for the SA DOD and a tailored solution will have to be constructed in order to deal with the secrecy dilemma of what to secure and what not. DODI30 (A-1), DODI46 (A-1) and DODI50 (A-1) define explicit classified information as -

> "…sensitive, commercial or personal information which is in material or record form, must be protected from unauthorised disclosure and must be safeguarded according to the degree of harm that could result from its unauthorised disclosure. It may be made accessible only to those

[84] Espionage. The covert means by which countries, organisations and individuals endeavour to acquire classified information of national interest to which they are not entitled, with the objective of gaining a strategic or tactical advantage over the target country. (Source: Defence Intelligence Division own Description). (DODI30: A-2)

> holding an appropriate security clearance and who have a legitimate need-to-know to fulfil their official duties or contractual responsibilities. Classified information must be classified as MOD Restricted, Confidential, Secret or Top Secret.".

This definition does not include tacit forms of the knowledge continuum that will also need protection from a counterintelligence perspective. Using the construct which is being defined in the definition is also problematic, resulting possibly in a very limited definition and understanding.

DODI50 (A-1) defines sensitive information as that which - "… may be protected from unauthorised disclosure in order to prevent the national interests of the Republic from being endangered.".

DODI60 (B-1) states another definition of classified data/information as being - "Official [SA DOD] information that has been determined to require protection in accordance with the sensitivity thereof.". This points to explicit information and leaves the interpretation of what is official and not an open question. It introduces a requirement for policy and doctrine on tacit knowledge held by human capital. DODI40 (38) describes classified commercial information within the SA DOD tender process as –

> "Companies who lose in the tender process shall, on request, be informed of the evaluation criteria and process that was followed, without divulging information of commercially confidential nature, detail evaluation results, or information that could prejudice the competitive advantage of any of the companies who participated in the tender process.".

Classified commercial information thus speaks to the advantage of contracted companies when contracted by the SA DOD, with typically IP in mind. Nothing is said about knowledge in the definitions above, which has implications for the security of the tacit knowledge inherent in human capital. If information is representative of the entire knowledge continuum, from an SA DOD perspective, it could be assumed that the policy statements hold true for the entire knowledge continuum and not just explicit information. It does, however, not include tacit knowledge held by human capital. Thus, the requirement for a coherent and integrated understanding and management of the knowledge continuum is evident in order to provide comprehensive knowledge continuum security.

These statements and descriptions above are calibrated inadequately. The sheer number of different conceptualisations of what classified information also pose a problem. an SA DOD KMC could be of great value in managing the taxonomies of these constructs. For the SA DOD classified information should be all information (based on the SA DOD policy and doctrine that information includes data and knowledge) that is critical to national security, military security and advantage in operations as alluded to in DODI30 (A-2) in the definition of espionage (see footnote 84). This is stated in SANDFP4 (L-1) – "… any information which is held by or for, is produced in or for, or is under the control of the State or which concerns the State and which must, for the sake of national security, be exempted from disclosure and must enjoy protection against compromise". Classified SA DOD knowledge continuum artefacts share a direct and distinct nexus with advantage. Nothing is said about classified human capital (tacit knowledge). Thus, the security-related classification of SA DOD knowledge continuum artefacts and human capital should share a direct and distinct nexus with advantage in order to calibrate the value of these unambiguously.

In order to calibrate 'sensitivity' of information as described above, DODI39 (A1-2) details the information security classification regime as follows:

> "g. Classified Information. Refers to all information that qualifies for protection against unauthorised disclosure [due to its possible impact on national security and interest]. The allocation of a security classification is the responsibility of the originating authority of the information to be classified and shall be done in accordance with the following definitions;
>
> i. Restricted: The security classification allocated to all information that may be used by hostile/opposing/malicious elements to hamper activities or inconvenience an institution or an individual;
>
> ii. Confidential: The security classification allocated to information that may be used by hostile/opposing/malicious elements to harm the objectives and functions of an individual and/or institution; [DODI23 (A-1) - "… information that is protected by the domestic law of the Parties to the agreement or is protected in any other way".]
>
> iii. Secret: The classification allocated to information that may be used by hostile/opposing/malicious elements to disrupt the objectives and functions of an institution and/or state; and
>
> iv. Top Secret: The classification allocated to information that can be used by enemies/hostile/malicious elements to neutralise the objectives and functions of institutions and/or the State. (Source: DOD Dictionary of ICS Terms v 1.0).".

The quotes above seek to regulate the security requirement for SA DOD information. Note, policy, doctrine, intelligence and IP are not even mentioned as constructs. This is again a product of the SA DOD conceptualisation of information as inclusive of these. When accurately defined in an authoritative taxonomy and managed by an SA DOD KMC, the impact of classified data vs. classified information vs classified categories of capstone knowledge will become clearer. This clarity should have an impact on the allocation of management resources and funding.

The classification regime outlined above also impacts the sharing of SA DOD knowledge continuum artefacts. Sharing, within this context, will become increasingly cumbersome as the threat level to national and defence interest increases. This translates into a KM quandary – knowledge sharing will be hampered most when knowledge is needed most. To manage this predicament the SA DOD needs a tailored solution for SA DOD KM.

DODI28 introduces classified knowledge. DODI28 (8) states that access to classified ergonomics knowledge is controlled by the Controlling Body for Ergonomics -

> "Ergonomics Database. The ergonomics database is viewed as a strategic asset to the DOD. It contains subject specific [*sic*] intellectual property, knowledge, research information, strategic personnel and job profiles, Defence ergonomics best practices and analysed operational data. Specific RSA Defence ergonomics information (RSA-Mil-Documents) is available on the ARMSCOR website at http//armscor.co.za. Access to classified data is limited and controlled by the [Controlling Body for Ergonomics]." (DODI28: 8).

The quote above includes security requirements for data, information and knowledge but not human capital. The requirement is also linked to the strategic nature of this to the SA DOD. DODI23 (42-43) states the requirement for IP security but mostly focuses on information security.

DODI28 (18) also makes reference to data security from the perspective of IP management - "In terms of data security, the rules of the DODD/POL&PLAN/00010/2003: Management of Defence Intellectual Property, dated 10 March 2005 (Reference I), must be adhered to".

DODI28 (13) states further that - "The ARMSCOR Institute, ERGOTECH, shall be considered the primary ergonomics provider for the DOD", responsible for the security of the ergonomics database. This identifies the security requirement for SA DOD IP over and above information security.

DODI28 states the requirement for data security (DODI28: 8), IP and information security (DODI28: 16 and 18) as the responsibly of the Controlling Body for Ergonomics -

> "Intellectual Property and Information Security. RSA-Military standards are administered by ARMSCOR, but remain the intellectual property of the DOD ... Aspects pertaining to the issuing, distribution and use of RSA-Military standards fall within the mandate of the CBE and are regulated by pre-determined conditions of use. The [controlling Body for Ergonomics] and ARMSCOR are responsible for exercising the necessary control measures to ensure, as far as practically possible, that intellectual property conditions are being complied with, and to prevent security violations regarding the use of military related [*sic*] information." (DODI28: 16 and 18).

What is problematic about the heading above; it clearly separates IP and information. This questions the definition of SA DOD information as being inclusive of knowledge such as IP. On the other hand, it assists with the understanding that security is a requirement for SA DOD information and knowledge. One might even go as far as assuming that there might be management differences for these constructs from a security requirement perspective.

SANDFP3 (15-4) defines counter-intelligence as that phase inclusive of all activities - "… devoted to destroying the effectiveness of inimical foreign intelligence activities and to the protection of information against espionage, personnel against subversion, and installations or material against sabotage". DODI57 (B-3) defines counter-intelligence as – "Measures and activities conducted, instituted or taken to impede and to neutralise the effectiveness of foreign or hostile [IntOps], to protect classified intelligence and to counter subversion, sabotage and terrorism aimed at or against personnel, strategic installations or resources of the [RSA]". The question is whether counter-intelligence is directed to protect information or intelligence? The clue is in the name – counter-intelligence. However, because the SA DOD regards information as inclusive of data and knowledge and thus by implication intelligence, counter-intelligence is directed towards the protection of SA DOD information. The fact that the SA DOD has not made up its corporate mind about this is evident in the second definition. The researcher is of the opinion that counter-intelligence should be mandated to protect all SA DOD knowledge continuum artefacts and human capital in the interest of national security and interest in order to secure advantage. Again, a proposed SA DOD KMC should have a priority tasking to provide the SA DOD with an authoritative taxonomy on these and related construct meanings.

DODI23 expresses on the requirement for management information in order to manage SA DOD IP in accordance with the regulatory framework and the requirement for information security. DODI23 does not equate information to SA DOD IP but rather expresses the requirement to have information about SA DOD IP in order to successfully manage and secure these assets.

DODI23 (6) states - "Defence matériel related IP management (as part of ICA management) is focused on the practice of trade secrets …" and - "… ensures contracting with the distinct aim to secure continued use and security of supply of defence ICA (specifically defence matériel related IP) by the [SA DOD]". To this end, DI (counterintelligence specifically) are to manage the - "… security and other aspects of project security that relates to the establishing and managing of defence IP" (DODI23: 8). DODI23 (10 and 33) further highlights the importance of IP protection. These matters correspond to the discussion earlier in the dissertation on the importance of security of knowledge. DODI23 (43) states that DI is responsible for the classification of SA DOD records – in particular, ensuring these are not disproportionately overclassified. SA DOD KM champions and role-players are discussed later in this chapter.

DODI50 (11) equates doctrine to information and DODI50 (12) equates information to trade secrets (or IP), thus linking the three constructs. In terms of trade secrets, it states the following – "Trade secrets of the State or a public body, or [sic] financial, commercial, scientific or technical information, which would be likely to cause harm to the commercial or financial interests of the State or public body if it is released. Information of which the disclosure could reasonably be expected to put such public body at a disadvantage in contractual negotiations or prejudice it in commercial competition may also be denied.". This speaks about IP and its security is at the discretion of the SA DOD (DODI50: 12 and 13). It also confirms the link between SA DOD capstone knowledge (IP in this case), security and advantage.

IDODI1 (9) states that it is not allowed to publish copyrighted information on social media. What it fails to do is labelling the copyrighted material as IP. As with IP, the copyrighted material should enjoy the same protection as other SA DOD knowledge continuum artefacts. Copyrighted material is typically assigned copyright because it is publically available and can thus be copied with associated loss of control, income, and advantage. The security is thus from a commercial perspective. Trade secrets, however, are not copyrighted because secrecy is more important than having the material in the public domain. The secrecy element to trade secrets ensures exclusivity and control and aims at a commercial and operational advantage. Trade secrets are typically found in the science, engineering and technology domain and associated knowledge and products. The SA DOD has a considerable portfolio of knowledge that is managed in this domain that requires security using trade secrecy as well as the SA DOD security classification regime outlined above.

DODI30 explicitly deals with the requirement of security within the SA DOD. As such DODI30 (5) makes mention of - "… classified knowledge/information" and also mentions two processes - "… recorded or transmitted". The protection required is security measures against - "…compromise, loss or destruction". The policy statement makes a distinction between knowledge and information but fails to mention data. In essence, no access will be provided to knowledge/information if there is a risk of compromise, loss or destruction. Such a risk is always present and cannot possibly be totally mitigated. Thus, this severely impacts knowledge sharing, transferring and growth in order to protect what is known. It will have a distinct impact on decision-making, action, effects and advantage. In the same manner as the dissonance achieved by DODI28 above – DODI30 (2-1) states the following about information security -

> "1. The classification of [Defence Community] information in order to protect it from unauthorised disclosure is an important security measure. All [Defence Community] information

must therefore be classified according to one of the classifications prescribed in Chapter 3 of [DODI30].

2. All classified [Defence Community] knowledge which can be transmitted by any means or any method, whether by word of mouth or by way of a document or materiel [*sic*], irrespective of how it was originally obtained, must be protected against any compromise or loss, irrespective of the CI threat manifestation.".

Both knowledge and information are listed under the heading 'information security' as if the policy writer at the time was sure of the distinction but hesitant to make a chapter for knowledge security. However, what is important is that security for both is stated separately. Also important is the mentioning of human capital that is included in the policy statement (i.e. verbal articulation of knowledge). It is only data that is excluded from the statement.

SANDFO4 (4 and 5) provides a hierarchy of SA DOD Joint Doctrine documents stating that the Joint Warfare Publications (JWP) and Joint Warfare Manuals (JWM) should not have a security classification higher than Restricted. This is important for the sharing and use of this knowledge. It still restricts the distribution of the documents in the public domain.

DODI27 (A-3) quotes the South African National Treasury Regulations dealing with unlimited access to information afforded to internal auditors in the execution of their governance related duties. This is, however, calibrated by security clearance requirements as stated by DODI27 (10) and in general by SA DOD Level 1 policy and doctrine dealing with information security and counter-intelligence. DODI48 (16-17) states in terms of performance auditing –

"The [Auditor General South Africa] has, in terms of Section 15 of the Public Audit Act, 2004, unrestricted access to all [SA DOD] documentation and personnel to successfully execute its functions. The [Auditor General South Africa]'s access to [SA DOD] information is however subject to the [SA DOD]'s security arrangements. … Appointment of External Auditors. The [Auditor General South Africa] may in terms of Section 12 of the Public Audit Act appoint external auditors to conduct audits within the [SA DOD] on behalf of the [Auditor General South Africa]. These external auditors will be subject to the [Auditor General South Africa]'s code of conduct and any directives issued by the [Auditor General South Africa] (including the [SA DOD]'s security arrangements), and will always be issued with letters of appointment from the [Auditor General South Africa]. The external auditors' access to [SA DOD] information is subject to the [SA DOD]'s security arrangements.".

Thus, although there is other legislation that impacts access to SA DOD information – it remains the SA DOD's prerogative to authorise and facilitate this access based on its own security regime. Also note, this access requirement for [Auditor General South Africa] is for information – not knowledge, stated by legislation, not SA DOD policy.

DODI39 speaks to the management of the SA DOD intranet system and related websites. The policy elaborates on specific technical issues as well as on the security requirement for the web-based content. As such DODI39 (viii an ix) states - "The [SA DOD] Intranet Service is secure, protected from external and illegal internal access and information is appropriately security classified and authorised for publication by [DI]" and "[SA DOD] Intranet users are responsible for their information activities and Chiefs of Services and Divisions must ensure that Information and

Communication Security prescripts pertaining to the [SA DOD] Intranet are adhered to.". Again, only information? The security requirement is thus extended to include cyberspace as a domain used to share and store knowledge continuum artefacts. It will require specific competence to manage such artefacts in the form of web-based content; such responsibility is allocated to Command Management Information Systems (CMIS) and DI. Web-based content can portray similar characteristics as records. The question is; are they similar or not – raising further questions as to the records management policy of the SA DOD and its applicability.

DODI42 (10) describes specialised risks as follows - "Risks which fall into specialised categories (risk areas where different risk criteria are required due to corporate governance needs and regulatory framework requirements) such as fraud and corruption, security, information …, must be managed by means of separate risk assessments, conducted by Services and Divisions. The risks identified during these risk assessments must be included in the relevant risk registers … and in the [SA DOD] consolidated risk register.". When there is risk, mitigation and/or security is required. Notably, knowledge is not mentioned as a specialised risk, only information. This is probably based on the perception of the SA DOD that information is knowledge.

DODI46 details aerial photography policy in the SA DOD. It states that – "Aerial photography or imagery is important for both civilian and military purposes." - and that "The military use it for specialised purposes such as imagery intelligence, operational planning and target acquisition … Such imagery is part of a greater system of information collection and intelligence production." (DODI46: 1). This text not only separates information from intelligence as different constructs but insinuate the intelligence cycle by stating that information is collected (not produced) and then subjected to a process (the intelligence cycle or puzzle building) to generate intelligence. This policy statement clearly recognises that intelligence is more than information. Several other references are made to the needs for security of SA DOD aerial photography information (DODI46: 2, 5, 6, 9 and 10) and by implication also knowledge security. In fact, aerial photographs are probably much closer to being a knowledge artefact than being information.

DODI39 addresses the requirement for information security on SA DOD intranets in general. Knowledge security is not addressed. DODI57 details the SA DOD Level 1 policy on Information Communication System (ICS) security. The entire DODI57 is relevant, however, for the researcher not to stray too far from the research questions, it is safe to say that DODI57 highlights the requirement for SA DOD information security, and Information and Communication Technology (ICT) and system security as enablers to IM – and inevitably will result in important enablers to a future SA DOD KMC. DODI57 does not describe knowledge continuum security in general. DODI57 (B7 and B8) elaborates on security requirements for ICS only, and in particular -

> "65. [ICS] Domain. An inter-connected [*sic*] set of information resources under the same direct control of a single management authority (for example system manager) within a domain that shares common functionality. A domain is a group of computers and devices on a network that are [*sic*] administered as a unit with common rules and procedures where all the components of the system are subject to a single, system-specific security plan.
>
> 66. [ICS] Security. The protection afforded to information systems in order to preserve the availability, integrity and confidentiality of the systems and the information contained within the systems according to affordable security practices. Such protection is the application of the

combination of all security disciplines, including information security, communication security, operations security, resource protection, physical security and personnel security.

67. [ICS] Security Officer/Official (ISSO). An officer/warrant officer/manager appointed and sufficiently cleared and qualified to assure security of information systems and the information during insertion/extraction from information systems within the context of a user system (unit), higher order user system (Brigade/Division/Service), or within the context of product system management. (Also in DODI60: B-2)

68. [ICS] Security Policy. A security policy applicable to all components of ICSs in an organisation that addresses the course of action to implement rules, regulations and controls to ensure physical, environmental, personnel, information and communications security. (Also in DODI60: B-2)

69. [ICS] Technology. Any equipment or interconnected system or sub-system [*sic*] of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission or reception of vocal, pictorial, textual and numerical data or information by a micro-electronics based combination of computing, telecommunications, video and/or any electronic or electro-magnetic [*sic*] communication means.

70. Information Assurance. Measures used to protect and defend information and information systems by ensuring their availability, integrity, authentication, confidentiality and non-repudiation. This includes providing for restoration of information systems by incorporating protection, detection, and reaction capabilities.

71. Information Security. The method of protecting information in computer and communications systems against unauthorised access, disclosure, transfer, modification and destruction whether accidental or intentional.".

DODI60 (3 and 5) states that - "No information with a classification higher than "confidential" may be sent over the [SA DOD] Electronic Mail System unless an appropriate [SA DOD] approved encryption application and algorithm is used …"; and - "Only data where the content is classified up to and including "Confidential" may be transmitted via e-mail. No information classified secret or top secret shall be sent via DOD E-mail System unless authorised by the appropriate authority". This will considerably slow down knowledge sharing if users do not have the correct clearance and encryption level to access the information.

Other security-related policy statements deal with social media and personal information. IDODI1 details the use of social media by the SA DOD. FMDI1 (8 and 9) states the security aspect about information published on social media by the SA DOD, primarily referring to legislation and other SA DOD Level 1 policy and doctrine on matters of information security. JDP1 reiterates the right of confidentiality of medical information and DODI 43 (J2-3) states the security requirement for SMS personal data. These stipulations conform to the security issues already discussed above.

6.2.4.2 Philosophy, Architecture and Integration

The researcher could not find any evidence of an SA DOD KM Philosophy in any of the policy documents selected or elsewhere. DODI24 (35) states that the SA DOD has IM Philosophy that should be followed whenever there is a risk of loss of data, typically when software is disposed of or updated. For the purposes of this analysis and the apparent importance of the SA DOD

philosophy as stated in several of the selected samples of SA DOD Level 1 policy and doctrine, the IM Philosophy was consulted for clarity. The SA DOD IM Philosophy can probably be considered Level 2 policy and/or doctrine.

The SA DOD IM Philosophy aims at the management of the SA DOD enterprise information, progressively moving away from an IT-driven IM philosophy to that of an SA DOD information systems philosophy (Information Management Philosophy: 2007) -

> "The focus of the IM Philosophy is on providing direction with regard to IM in the [SA DOD]. This is to ensure a comprehensive and consistent approach to the management of information in the [SA DOD], which will optimise the value of [SA DOD] information assets, aligned with recognised IM standards and good practices." (Information Management Philosophy: 2007: vi).

This, according to the document, is the first step towards the "… ability to improve [SA DOD organisational] maturity by inculcating a knowledge culture in an information orientated organisation therefore becomes the next strategic ICT management perspective." (Information Management Philosophy: 2007: v).

Although firmly entrenched in the information era and its associated thinking, the philosophy is positioned to provide a sound platform for the construction and implementation of SA KM (Information Management Philosophy: 2007: 31 and 41). This is one of the few SA DOD documents that refer to KM and provides some hint as to a definition of knowledge promoted within the SA DOD. The philosophy does not offer an analysis of knowledge nor KM as the next level to be achieved. In the researcher's opinion, this is a symptom of SA DOD capability champions retiring without being able to commence with the construction of the next phase, and/or not being able to instil adequate interest in the successor to take the initiative to its conclusion – i.e. SA DOD KMC. The DR 2015 speaks of this knowledge sharing and leadership gap, but only speaks to information and IM and not recognising the importance of knowledge as the actual strategic asset and KM as the enabler to secure an advantage from knowledge.

The SA DOD IM philosophy recognises the knowledge hierarchy (i.e. data, information, knowledge and wisdom), but interestingly, no mention of intelligence is made as was discussed in the literature review (Chapter 2 of this dissertation). It could thus be assumed that intelligence is conceptualised as being part of either information or knowledge. The IM philosophy, however, does not recognise that there is a dynamic overlap between the constructs which makes the conceptualisation of a knowledge continuum much more preferable.

The definition of knowledge promulgated in the IM philosophy is - "Knowledge is information in context, together with an understanding of how to use it (Brooking, 1999)[85]" (Information Management Philosophy: 2007: 9). This would correspond to elements of the definition of knowledge and KM of this dissertation but is by no means comprehensive enough. It also contradicts the definition of information in several SA DOD Level 1 policies. There is thus a recognition of the fact that knowledge is more than information and data – hence the projection of the philosophy that the next level for the organisational growth path is KM. Reference made to the

[85] Brooking, A. (1999). *Corporate Memory. Strategies for Knowledge Management*. International London: Thomson Business Press.

constructs of context and understanding points to the complexity of KM vs. IM. How this definition of knowledge was chosen amongst many others available from the literature, at the time, is not clear. It does not indicate how much context is required to reach knowledge status and understanding is only linked to utility and not to knowing. Also, the Brooking definition originates from an early stage of the development of KM as a management discipline. More definitions should be considered for the SA DOD to be able to construct a knowledge and KM definition suitable for an SA DOD KMC. This dissertation considered several definitions originating from all parts of the world and over an extended period of time to inform the definitions of knowledge and KM proposed for a future SA DOD KM and KMC. The definition does not allude to the evolutionary process that considers changing context and is thus very static. The definition does not point to the objective of creating knowledge – i.e. to create new meaning – and what this new meaning will be useful for, which could be indicators for what IM and KM systems are required by the SA DOD – i.e. systems for decision-making, action, effects and advantage. Thus, the SA DOD will possibly manage information for the sake of managing information and not linked to the requirements of managing knowledge in the SA DOD. Information management systems will be selected and maintained based on the silos that exist within the SA DOD. Knowledge management systems can be the integrators to this predicament. There is a considerable requirement for integration of the SA DOD knowledge continuum based on the discussion thus far.

The SA DOD, furthermore, recognises the value of mapped organisational information. This is fundamental to IM. JDP4 (D2-12) states the following about information architecture –

> " … Information Architecture is a high-level map of the information requirements of an organisation. It is a personnel, organisation and technology independent profile of the major information categories used within an enterprise. It provides a way to map the information needs of an organisation, relate them to specific business processes, and document their interrelationships. The interrelationships between information and processes are used to guide applications development and facilitate integration and sharing of data.".

DODI22 (16) states that IM code is important to the establishment of organisational structures in particular during the planning phase. The statement confirms the co-dependency of data and information with regard to organisational information requirements. It further states the importance of this architecture to be able to implement and/or integrate the correct IT solutions as enablers. It does not express a relationship with organisational knowledge.

Much the same, DODI26 (Appendix A -1) defines business architecture as - "The coherent and authoritive [*sic*] source of knowledge about what an enterprise does; how, when, why and where it operates; what resources are being used in the process; and with whom it interacts (internally and externally) in fulfilling its mandate". SANDFP1 (2) states that the SA DOD has the - "Defence Enterprise Information System (DEIS) Master Plan" to facilitate integration. It provides an - "… integrated [SA DOD ICS] view and a realistic single execution mechanism of all [ICS and Services] initiatives, programmes, projects and requirements in terms of both the investment and maintenance portfolios". So, the SA DOD is thoroughly entrenched in IM architecture.

These architectures will provide a valuable foundation to SA DOD KM because it will inform a knowledge audit of the SA DOD and subsequent SA DOD knowledge map. For the SA DOD to get to the next level of competitiveness and advantage it needs to progress to a knowledge

architecture, thus separating the information and knowledge components to ensure that decisions, actions, effects and advantage are based on knowledge rather than on information. The final goal for the SA DOD would be to construct a dynamic integrated enterprise architecture that exists to integrate the entire SA DOD knowledge continuum with processes, sensors and IT systems. This is reflected in Figure 6.9.

DODI26 (10) makes mention of external data sources and that the SA DOD should endeavour to maintain links with these where relevant. SANDFP3 (xvii and 12-2 and 12-3) states that IT is an important enabler to provide the deployed forces with tactical, operational and strategic information. "This information must ensure that all members participating in the mission are adapting in near real-time to rapid changing circumstances." (SANDFP3: 12-2). It should also ensure the - "… sharing of information within the joint, inter-departmental and multi-national context … The enabling of the seamless sharing of information during the interdepartmental deployment of forces." (SANDFP3: 12-3).

These requirements point to the fact that integration should also be achieved with external stakeholders and role-players. This confirms the requirement for integration of IT systems and IM efforts in support of agility, adaptability and flexibility within complex environments and facilitating information sharing. This supports the idea that IT is a mere enabler to IM and KM and does not constitute IM or KM. The level of integration highlighted above will require strong leadership.

6.2.4.3 Knowledge Champions and Primary Functional Role-players

The selected sample of SA DOD Level 1 policy and doctrine documents do not make any mention of an SA DOD KM champion of a CKO. This clearly points to the fact that there is no single point in the SA DOD where all types of SA DOD knowledge converge to be managed in a coherent and integrated manner. Although the SA DOD employ information managers, doctrine managers, intelligence managers, and IP managers – the management of these functional areas remain in silos with no integrating functionary such as a CKO leading an integrated KMC to ensure advantage maximisation.

The CIO for the SA DOD is the Director General (or Sec Def) as per PAIA (Sec 1(a)(ii)) as discussed in Chapter 5 of the dissertation. Yet, DODI50 (Disclosure of Defence Information) makes no mention of this. The researcher could only find one reference to the SA DOD CIO in the selected sample, as legislated - "No staff member shall provide information and records that are not in the public domain to the public without consulting the [CIO]. Specific guidelines regarding requests for information are contained in the Promotion of Access to Information Policy." (JDP 9: 31).

IDODI2 (7) states that the Sec Def (CIO and SA DOD accounting officer) is accountable for establishing and managing systems for the management of performance information in the SA DOD. However, the functional responsibility lies with C CMIS. The reason for this is that CMIS not only manages the information technology of the SA DOD but also de facto the data/information/knowledge flow within the SA DOD by virtue of the responsibility for the functionality of the SA DOD data and information networks, cyber domain and the archive function as described in the DR 2015 and SA DOD policy. The Sec Def is thus a primary SA DOD

knowledge champion from the perspective that the SA DOD regards information as inclusive of data and knowledge, critical for integration with a future SA DOD KMC.

DODI48 (2) states – "The CSANDF is responsible for the command, control and administration within the SANDF and must supply the Accounting Officer [Sec Def as the SA DOD CIO] with any information as requested. [Section 15(e) and (g) Defence Act]". DODI27 (A-1) quotes the legislated requirement (Defence Act 42 of 2002 (Section 14.g) of information sharing between CSANDF and the Sec Def. As stated in Chapter 5 of the dissertation – knowledge should be included in Section 14.g of the Defence Act. This information sharing requirement between the two components of the SA DOD (the Defence Secretariat and the SANDF) is and should be the primary driver for the requirement for coherence and integration. Such coherence and integration will require the identification of leaders within each domain in order to understand C2 relationships that will require refinement to replace the information and knowledge silos in the SA DOD with an integrated enterprise knowledge continuum.

JWP4 (vi), SANDFO4 (1 and 3), SANDFD2 identify key research, development and management role-players of SA DOD joint doctrine as being CSANDF, C JOPS, Chiefs of Services and Divisions, Joint Doctrine Committee and operational level staff. More detail as to their responsibilities are as follows:

"a. Controlling Authority – [CSANDF]. He is overall responsible for all aspects relating to the development of Joint Doctrine. He may delegate this to the [C JOPS].

b. Responsible Authority – [C JOPS]. He is responsible to the [SANDF] for the research and development of Joint Doctrine and the management of the Joint Doctrine process as delegated in his performance agreement.

c. Staff Authority - Chief Director Operations Development. He is responsible to the [C JOPS] for the development, control and management of Joint Doctrine.

d. Staff Authority - Director Doctrine Development. He is responsible to the Chief Director Operations Development for the research, planning, development, approval, promulgation, distribution and maintenance of all Joint Doctrine. He also is the appointed chairperson of the Joint Doctrine Committee. [SANDFP2 (7) states that the Director Doctrine Development should maintain a joint doctrine publication register and issue a status report on doctrine every two months. JDP will be published on the SA DOD policy database.]

e. Staff Authority – Joint Doctrine Committee. This committee consists of representatives of the services and divisions and they are responsible for scrutinising doctrine for appropriateness and correctness. This committee forms the first level of approval. They may initiate the development of doctrine by issuing a project directive to any specialist in his/her field within the SANDF.

f. Staff Authority – Chiefs of Services and Divisions. They are to assist with the research and development of all Joint Doctrine. They are to implement promulgated Joint Doctrine. They are to test Joint Doctrine during force preparation and are to give feedback in the form of lessons learnt to [C JOPS] regarding all aspect of Joint Doctrine.".

Specifically, also, DODI31 (9 and 10) states that the Chief of Services and Divisions are responsible for their own chemical, biological and radioactive doctrine under the guidance of [C JOPS]. In support of the above policy statement, DODI1 (4-9 and 4-11), SANDFP2 (2- 6) and

SANDFP3 (vi) state key SA DOD doctrine management role-players – i.e. C JOPS, the SANDF Joint Doctrine Committee and Doctrine Development Task Teams, Operations Staff Council, SA DOD Planning Board and the Military Command Council, Publication Development Officer (also SANDFO4: v, SANDFP2: 2, 3 and 6), Director Doctrine Development (also SANDFO4: v, SANDFP2: 2, 3 and 6), Director Doctrine and Policy, SO1 Doctrine Management, SA DOD Project Officer (DODI40: 112 and M9-4) and Services and Division (SANDFO2: 2-1-11 - unique fire and rescue doctrine).

DODI40 (27 and 50) states throughout that doctrine development form a distinct part of the acquisition of a user system. DODI40 (109) states that the SANDF is responsible to conduct a comprehensive doctrine study before acquired systems can be operationalised. Thus, the development of military knowledge, as well as the alignment of matériel with existing military knowledge such as doctrine, is an integral part of defence matériel acquisition. DODI56 (2) states that ETD doctrine is the responsibility of the Chiefs of Services and Division. DODI40 (56) states that the Command and Control Capability Board is distinctly responsible for the review and approval of doctrine that impacts C2. These role-players ensure SA DOD doctrine coherence and integration. C SANDF is ultimately responsible for SA DOD doctrine and is thus a primary SA DOD knowledge champion, critical for integration with a future SA DOD KMC.

DODI9 (4) names two key role-players in SA DOD IM – the Government Information Technology Officer and C CMIS.

> "The [Government Information Technology Officer], on behalf of the [Sec Def], is the appointed functional authority for defence enterprise information, information technology and information management in the [SA DOD]. This implies the specific responsibilities of strategic direction, policy and control with regards [*sic*] to information and information communication technology.". Also - "C CMIS as head of the CMIS Division and the prime system integrator is responsible for realising effective management of information, including the management of records as strategic resource. The [Sec Def] as Head of the [SA DOD] has designated [C CMIS] as the [SA DOD] Records Manager in terms of section 13(5) of the National Archives and Records Service of South Africa Act.".

All the policies and most doctrine refer to C CMIS in the distribution list. DODI53 (13) refers to the C CMIS erroneously as Chief of Command Information Management Services (DODI53: I-2)). C CMIS is mandated to execute SA DOD IM and ICT management on behalf of the Sec Def (or SA DOD CIO), making C CMIS the *de facto* SA DOD CIO.

It could be argued that either one of these should be considered to be the SA DOD CKO since there is no SA DOD Chief of Command Knowledge Management Services or a CKO. However, this would encroach on the mandates of those functionaries responsible for the management of policy, doctrine, intelligence and IP as other categories of capstone SA DOD knowledge.

SANDFP3 (14-6, 7, 8) confirms the process support role of CMIS to the SA DOD. DODI40 (56 and 58) states that the CMIS Board is responsible for - "… to ensure uniformity in infrastructure & data management throughout the [SA DOD].". This Board is thus a key role-player in the governance and management of enablers for a future SA DOD KMC and a dynamic

integrated enterprise architecture. However, it only refers to data management, which is disappointing.

IDODI2 (8) states that the Information System Support Manager within the CMIS environment - "…is responsible to provide the infrastructure and specification standards for information systems to support monitoring and evaluation in the [SA DOD]". DODI24 (3) confirms the SITA roles within the SA DOD - amongst others data processing. DODI24 (16 and C-3) states that the Software Asset Manager is responsible for data management of software and related assets.

DODI57 (7-1, E2 and E3) refers to the function of the Computer Information Management as a function of CMIS. Computer Information Management is basically the maintenance, in conjunction with the logistics officer, of a detailed record of all equipment linked to the local area network to maintain and update a detailed logical and physical design plan of the network and monitor the total performance of the network. It is a system to enable asset management.

DODISPF1 (23) and IDODI2 (23) state that DI is a Defence Programme. C DI and in particular Sub-Division Counter-Intelligence are responsible for SA DOD information-, intelligence security and counter-intelligence as discussed in some detail above. DODI28 (5 and 9) states that - "[C DI], [Sub-Division Counter-Intelligence], is responsible to monitor information security of the ergonomics databases and to scrutinise and provide authority for the release/access to [SA DOD] records in cases where such access to records is not requested in terms of the [PAIA]". Thus, C DI is not only a primary role-player in SA DOD KM (intelligence perspective) but also a primary role-player and security custodian of data, information and knowledge (counter-intelligence perspective). Another role-player in securing the information is the Controlling Body for Ergonomics and ARMSCOR (DODI28: 6, 8, 15 and 16) as stated above.

DODI33 (9 and 10) states the responsibility of DI for security within the context of South African Military Assistance and Training Teams. This would include information and intelligence security. DODI1 (7C-4) recognises the role of DI, specifically counter-intelligence in scrutinising corporate communication intranet information, which may also contain data and knowledge.

DODI24 (8) states the responsibilities of DI regarding software management as the performance of security testing of suspect software, specifically if used in sensitive environments and the security classification of SA DOD specific software. DI is also responsible for business processes publications security vetting (DODI24: 5) and SANDF policy publications security vetting (SANDFO5: 5). This reiterates the security requirement for policy as capstone military knowledge. Furthermore, as SA DOD KM champion, C DI is responsible for the management of two distinct types of intelligence as stated below. DODI31 (15) adds operational- and tactical intelligence to the list -

> "a. Management of Strategic Intelligence. Determination of the strategies, policies, missions, force structures and developments regarding the use of [chemical and biological] weapons of foreign states.
>
> b. Management of Technical Intelligence. Determination of technical capabilities of foreign weapon systems, types of agents and stockpiling of agents in order to be able to take timely decisions on effective defensive measures.".

This DI responsibility, in addition to what has already been highlighted earlier in this chapter, is the link between intelligence time-value, decisions and actions. In addition to the primary responsibility of DI for information and military knowledge security, Service/Divisional Chiefs shall be responsible for own specific tactical chemical, biological and radioactive related defence intelligence (DODI31: 4).

DODI57 (1-2) states the responsibility of C CMIS and C DI (Sub-Division Counter-Intelligence) to secure SA DOD data. C CMIS is responsible for the data and information integrity contained in IT systems[86]. This makes C CMIS a key role-player in a proposed SA DOD KMC due to the responsibility for the technology enablers to manage the knowledge continuum with. JDP15 (12) states that C CMIS and C DI are responsible for – "The authorisation for the use and retrieval of military information for the writing of a study or treatise". This statement highlights the fact that SA DOD data, information and knowledge security is a joint function based on two different perspectives – i.e. IT system perspective and a counter-intelligence threat perspective. Interestingly, it is legislated that the SA DOD CIO is the Sec Def, yet the Sec Def is not included in the approval line for research and dissertation writing. Chief of Human Resources as a primary knowledge champion of the SA DOD is also not included in the statement. These are important role-players in decisions about future knowledge creation as facilitated by the academic processes. Thus there is continuously a stated requirement for integration in order to provide coherence and optimum solutions to KM. C CMIS and C DI are thus primary SA DOD knowledge champions, critical for integration with a future SA DOD KMC. JWP8 (4-23) states about the role of SA DOD Corp Com as an integrated governmental function, linking communication and information very closely as follows -

> "In order to play its role in government communication and information campaigns the [SA DOD], led by the [Head of Communication] in the Office of the Minister of Defence, uses [Corp Com] to manage its total communication effort. [Corp Com] is aligned with government communication policy and direction, which is currently given to all government communication by the [Government Communication and Information System] in the form of the government communication strategy, themes and messages. In the [SA DOD], this direction is provided and channelled by the Head of Communication in the form of [Corp Com] policy, strategy, plans and guidelines, and includes messages and themes. [Corp Com] is also integrated throughout the [SA DOD].".

This policy statement confirms the complexity of the macro environment within which the SA DOD functions and its dependency on other departments for knowledge continuum artefacts, human and relational capital. DODI1 (1-4, 1-10, 2-5, 3-4, 4-37, 5-2 and 7-2), DODI23 (9) and IDODI1 (3) state that the SA DOD Head of Communications is the functional authority for the execution and implementation of SA DOD Corp Com doctrine and that doctrine forms part of the SA DOD Corp Com user and product systems. The SA DOD Head of Communications is central to this process. The future SA DOD CKO will thus have to be positioned carefully in order to facilitate this inter-departmental knowledge continuum management and exchange that will enable

[86] "Information systems are used to capture, store, compute, disseminate and archive large volumes of data and information…integrated information system (architecture, hardware, software, database and network." (DODERMF1, 6-1) "Information and Communication Technology (ICT) is the hardware or software of computers and other communication devices used in, or which could have an impact on the military environment." (DODI1: 1A-11)

the SA DOD Head of Communications with the appropriate knowledge continuum artefacts. Another integration is with C DI. Integration and coherence cannot be overstated as a requirement.

JDP4 (D2-6) states the requirement for the SA DOD to progressively develop towards a learning organisation. JDP3 (3-2) uses the construct of knowledge in conjunction with the study or learning process. For this to happen the SA DOD is required to continually invest in the "… knowledge, skills and competencies of its personnel". This is the responsibility of every SA DOD leadership position, but in particular and coordinated by C HR. Other primary role-players are Chief of Joint Training, which is a function with SA DOD C HR, responsible for SA DOD ETD doctrine (DODI16: 9). The importance of doctrine to SA DOD ETD was discussed earlier in this chapter (JDP16: B-3 and JDP16: C-1). The Joint Training Division has a Directorate Policy and Doctrine (JDP16: D-1). Thus, C HR is not only a primary custodian of human capital development within the SA DOD; CHR is also the knowledge champion on HRM related doctrine. This makes C HR a primary SA DOD knowledge champion that is critical for integration with a future SA DOD KMC.

DODI23 (v, 4, 8, 10, 12, 13, 15 and 43) states key role-players in the management of SA DOD IP; MOD, Sec Def (responsible for SA DOD oversight), Chiefs of Services and Divisions (designated nodal points for their structures for IP management), Chief Defence Matériel (the appointed nodal point for defence materiel related IP), Chief of Defence Legal Services, C DI (primarily counter-intelligence) and SSO Science and Technology Knowledge and Intellectual Property. The SSO post has since been renamed to SSO Intangible Assets. The Head of Supply Chain Integration function has since been integrated into Defence Matériel. Thus, over and above those already identified as primary SA DOD knowledge champions; the MOD, Chiefs of Services and Divisions, Chief Defence Matériel, Chief of Defence Legal Services is primary SA DOD knowledge champions, critical for integration with a future SA DOD KMC.

DODI40 (79) states that Defence Matériel Division is managing the SA DOD project database and DODI40 (F-4) adds the project milestone database. DODI40 (21 and 31) states that a manufacturing data pack of drawings and specifications are important products of the design development phase of SA DOD acquisition projects and that the main contractor is responsible for the configuration management of the data packs. Thus, the defence industry (represented by the contractor) plays an important role in the quality and security of SA DOD acquisition related data. This makes Defence Matériel Division an important role-player in SA DOD KM based on the formal and informal relational capital with the defence industry as well as the structural capital managed by the SA DOD by the defence industry as overseen by the Defence Matériel Division and Armscor through contracts. The manufacturing data pack of drawings, specifications and project milestone documents are considered capstone military knowledge from a project management perspective. These documents are not policy, doctrine, intelligence but much closer to a form of IP. Contracts are very comprehensive documents covering every aspect (why, who, what, where, when, how, which effect and what thereafter) and should possibly be considered another category of capstone military knowledge. Within contracts as a category of capstone military knowledge Memorandum of Understanding, Memorandum of Agreement and Service Level Agreements could possibly be added. Contracts form part of the organisational structural capital.

DODI40 (48 and 99) states the functions of the joint project team for armament acquisition, of which one is to address IP related issues during the project. Intellectual Property rights must be addressed in the Project Study, Project Study Report, Development Plan and Acquisition Plan (DODI40: 92, 94 and 104). ARMSCOR is responsible to address IP related issues (DODI40, 97, 98 and 102) during the System Study and Acquisition Study Competitive Tender and Acquisition Study Single Tender. This basically requires the project team to be aware and to manage SA DOD defence matérial IP related issues on a continuous basis.

DODI23 (13) states the key SA DOD decision-making forums involved with SA DOD IP management as the Armaments Technology Acquisition Secretariat, Defence Research and Development Board, Armaments Acquisition Control Board which provide approval for the leveraging of defence matériel related IP by Chief Defence Matériel. The Armaments Acquisition Steering Board provides approval for the leveraging of strategic defence matériel related IP by the Sec Def. The Armaments Acquisition Council provides approval for the leveraging of strategic defence matériel related IP by the MOD. These SA DOD knowledge champions and the associated management forums play a very important role in SA DOD KM and should thus be integrated with the management initiatives of a proposed SA DOD KMC.

DODI29 (9 and B-1) states the role of the Ammunition and Explosive Functional Controlling Authority in the management of the munition database. DODI29 (5) states the importance of the Munitions Safety Information and Analysis Centre for the sharing and analysis of technical munition related information to - "… aid munitions developers developing or modifying munitions, so as to have reduced vulnerability to unplanned stimuli and to reduce collateral damage.". This data is important for the control of munitions but also for research and development of munitions and explosive materials. It falls within the knowledge managed by Chief Defence Matériel.

DODI61 expresses on the SA DOD requirement for the maintenance of a Consultants Management Information System (which is essentially a database) for management and reporting purposes. The Chief Director Materiel Governance and the Consultant Control Principal within the Defence Matériel Division are responsible for this which adds to the importance of Chief Defence Matériel as an SA DOD KM champion.

DODI44 (7) states – "All badges, logos, insignia (or any other heraldic devices) are to comply with Government Communication Information Service and Heraldic prescripts". As stated earlier, GCIS is an important role-player in SA DOD KM from a corporate branding perspective but also from a military identity and *esprit de corps* perspective, because soldiers attach much value and pride to corps and unit insignia and qualification badges (amongst others things). These insignias are also important from a C2 perspective in military operations.

DODI23 (4, 13 and 15) identifies SITA and ARMSCOR as primary agencies in SA DOD IP management. ARMSCOR is responsible for SA DOD IP by virtue of the ARMSCOR Act (51 of 2003). ARMSCOR is the legislated custodian of SA DOD IP under the shareholdership of the MOD and direction of the Sec Def. DODI28 states that ARMSCOR is responsible to maintain the SA DOD ergonomics database as discussed earlier in terms of the requirement for security. This makes SITA and ARMSCOR a primary stakeholder in SA DOD KM and a key partner to a future SA DOD KMC.

DODI23 (3) states that the National IP Management Office is a key role-player in IP that is generated with RSA public funds. As such, all SA DOD IP is generated with public funds. The National IP Management Office is a structure within the Department of Science and Technology, which makes this department an important role-player in SA DOD IP management and a key partner to a future SA DOD KMC. The level of integration that can be achieved between the proposed SA DOD KMC, government agencies such as SITA and Armscor and other RSA governmental departments will have a significant impact on the success of SA DOD KM.

6.2.4.4 Critical Knowledge Management Components

Over and above the identification of SA DOD knowledge champions above and other fundamentals expressed on thus far; there are other critical components expressed on in the selected sample of SA DOD Level 1 policy and doctrine that will contribute to SA DOD KMC success.

Funding remains fundamental to the success of any organisational capability. Funding SA DOD knowledge development and then funding SA DOD KM are both critical. Some discussion about funding can also be found in the section dealing with security and the associated costs of security classifications. Knowledge plays a significant role in determining the funding requirements of SA DOD functions and capabilities. DODD2 (3) for example, makes reference to health intelligence as a factor in determining the costs of SA DOD health care. Having a KM champion, funding and other resources committed to a KMC fundamentally enhance the success rate; as was discussed in Chapter 3 of the dissertation from a USA military perspective.

JWP8 (4-11) states that the primary source of intelligence is human intelligence. This states the importance of people management in terms of knowledge development and sharing. This is premised on the fact that people inherently possess tacit knowledge and wisdom. When these are articulated or codified it becomes explicit knowledge (who, what, where, when, how, which effects and what thereafter). Such explicit knowledge is shared amongst interested parties typically at seminars and similar events but also during intelligence operations. This knowledge and the associated processes are critical to knowledge development from a learning perspective and from a situational awareness perspective.

The SA DOD recognises seminars, conferences, congresses and symposia as events that SA DOD personnel can gain knowledge from applicable to the workplace (DODI15: 4). If this is the case then the SA DOD should have a policy in place to manage the attendance of these events in order to expand the knowledge-base of the SA DOD. These events are critical knowledge sharing opportunities that should be managed in an integrated SA DOD knowledge sharing programme by the proposed SA DOD KMC. Also part of a learning organisation concept is transformation. JDP4 (B-6) states that data are important to the monitoring function within SA DOD transformation management.

DODI26 makes reference to a - "… subject matter specialist"; but more specifically, the requirement for this person to use their knowledge to - "… provide guidance to human resources so that they can make judgments, formulate decisions and do their work." (DODI26: 10). This is the ultimate goal of KM – i.e. to enhance decision-making, to enable actions and to deliver the desired effects and establish or increase advantage. Subject matter specialists are pivotal to corporate memory and are primary candidates for use in ETD, seminar, communities of practice, as sources of

intelligence – amongst several other uses. Subject matter specialists are the SA DOD's incubators of new and evolving meaning. Their availability to share knowledge should be managed centrally and in an integrated manner by a proposed SA DOD KMC, the Service and Divisional Chiefs and C HR (at the very least). A subject matter specialist database could be a powerful enabler to get 'the right knowledge to the right place at the right time in support of the right effects'. A form of subject matter expert is mentors which the SA DOD uses from time-to-time. JDP4 (13 and B-5) states that mentors should be considered as sources of knowledge to protégés. Mentors can also be positioned as an important coordinator for the sharing of knowledge and the establishment of a learning organisation. This not only confirms the distinct link between knowledge, people and learning but also support the importance of subject matter specialists.

In order to achieve 'learning organisation' status (as mentioned above and earlier in conjunction with doctrine, technology and people) it is important to have all the necessary knowledge resources in place. JDP9 (10) states that the SA DOD should make effective use of available expertise in the SA DOD such as - "… expertise in archives and records management, [IT], data and [IM], business system analysis and design, auditing, risk management, and law.". JWP1 (8-3) states –

> "b. Information as a Resource. CMIS has information resources in terms of libraries, digital information repositories and databases that can be most useful to [any SA DOD] functionary. This type of requirement may need to be fulfilled from South Africa when deployed externally and may require research, so lead times must be taken into account to allow for timely delivery of the required products. The majority, however, should be available on digital repositories accessible on the contingent's Wide Area Network.".

As such, all data, information, knowledge, and their associated repositories and subject matter experts are important resources to be managed by a KMC in a coherent and integrated manner for internal use but also when external partners are involved. Much of this has been discussed already above. The security aspect of knowledge continuum artefacts cannot be overstated, particularly when sharing is allowed and required with foreign partners during operations.

SANDFP3 (xv) states that a lack of infrastructure in the battlespace might hamper the flow of information. This statement can be expanded to 'flow of knowledge continuum artefacts' to eliminate ambiguity about what is required for operations in the battlespace. JWP8 (5-27 and 5B-1) states from a PSO perspective that - "Some nations may not be willing to divulge information, even to allies, and the absence of, and incompatibility of MIS within the [African Union] and [South African Development Community] will undoubtedly hamper the sharing of information.".

From the perspective of knowledge related structures, an organogram is provided by JWP8 (5-3) – see Figure 6.8 below, depicting the J2 (Intelligence) position within the context of the continental staff system discussed in military KM (dissertation Chapter 3).

The continental staff system and its shortcomings with regard to KM were discussed earlier in the dissertation. However, it remains a critical organisational structure and a C2 concept for the management of capstone military knowledge such as military intelligence and counter-intelligence.

JWP1 (7-2) states the importance of establishing an operations information centre for corporate communication activities –

> "An operations information centre is established in close proximity to or within the main operations centre, as a central point for the reception and dissemination of information about the operation, including media releases and briefings. It acts as the point of entry for all external requests for Corp Com related information".

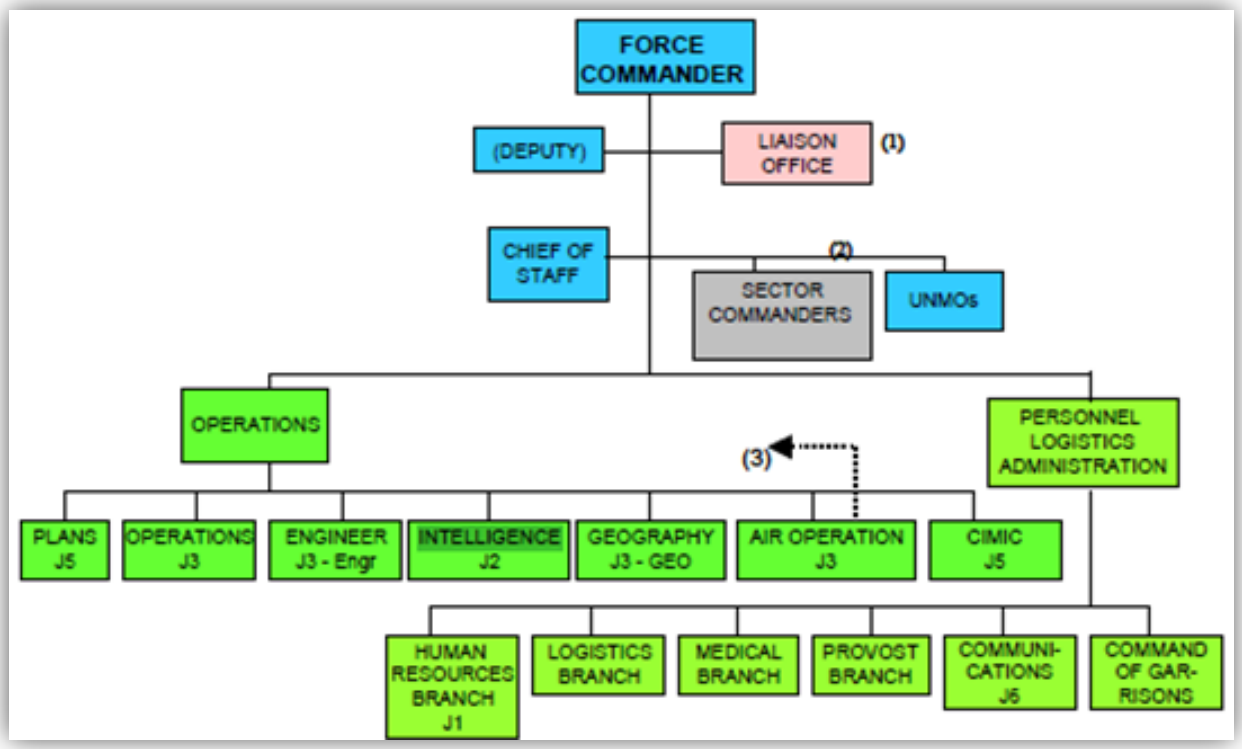


Figure 6.8: Continental Staff System

Source: JWP8 (5-3).

Corporate communications are part of the J5 staff function (Figure 6.8). The quote identifies another component of the knowledge continuum that exists in the continental staff system critical to the success of operations. This quote above highlights the importance of having structures or organisational components that provide coherence and integration in terms of what and how knowledge continuum is managed. The SA DOD has several organisational components that generate and manage knowledge (as discussed above) but no central organisation or component with which to achieve coherence and integration. The continental staff system could, however, be revised to include the C2 of the entire knowledge continuum in order to minimise the risk of not considering the impact of the entire knowledge continuum in an integrated manner. Integration with a KMC should enhance access to 'evolving meaning' by the commander and his staff.

Just as with funding discussed above, knowledge needs to be planned for and is fundamental to planning. For example, intelligence requirements must be planned for - "The [Force Commander], … , must drive and direct the conduct of intelligence gathering during PSO as in all military operations." (JWP8: 4-10). Within the context of PSOs planning assure – "… accurate, up-to-date information is vital to effective logistics planning and to supply distribution … The

information and data essential to effective logistic planning are much less readily transferred between nations with disparate doctrine and different [MIS].” (JWP8: 5-27 and 5B-1).

The planning for knowledge is a critical requirement stemming from the time-value of knowledge construct. It is closely associated with the concepts of ‘real-time’ and ‘near-real-time’ knowing required for decisions and actions. The more current knowledge is, the more accurate planning will be, enhancing the quality of decisions and subsequent actions, their effects and gaining advantage. These issues are reflected in Figures 6.9a and 6.9b.

Earlier in the chapter, the researcher referred to several policies, doctrine, strategies and philosophies. None of these exists for SA DOD KM. Without structural capital the SA DOD KM will not achieve coherence and integration and the establishment of an SA DOD KMC will have no basis. Structural capital is fundamental to SA DOD KM.

6.2.4.5 Processes

Taking note that SA DOD policy regards information as inclusive of data and knowledge; policy and doctrine statements about data management, IM and KM processes are considered and discussed in this section. Processes are fundamental to a future SA DOD KMC. Clarity is required about which are considered core processes and what other processes exist that are practices and prescribed within the SA DOD environment.

The following table represents a list of stated KM related processes from the selected sample of SA DOD Level 1 policy and doctrine. The similarities in those identified as core processes in Chapter 2 of the dissertation is quite evident -

Table 6.5: Types of Knowledge Management Related Processes

Knowledge Processes	Source	Recurring (with consideration of semantics)
Liaison and transfer	DODI1	Acquire, Generate, Integrate, Use, Retain, Sharing, Secure and Dispose
Transfer	DODI26	
Conceiving, creating, planning, designing and synthesis	DODI28	
Sharing, transfer, capture, store, process, communicate, protect, sustain, integrate and present	DODI39	
Transfer and injection	JDP16	
Acquire	DODI40, JDP14	
Retain, obtains, adapts, integrates, analyses, generation and sharing	DODI43	
Transfer	DODI61	
Transmit, evoke and acquire	JDP20	
Internalise, gain, acquire and apply	JDP3	
Acquire, acquisition and share/dissemination	JDP4	
Plans, collects, creates, organises, uses, controls, disseminates, sharing, recycling and disposes	JDP9	
Manipulation	SANDFP3	
Asses, identification, acquisition, procurement, registration, maintenance, use, retention, transfer, disposal/discarding, ownership, protection, funding, maintenance, management of royalties and revenue	DODI23	
Identification, acquisition, procurement and registration,	DODI24	

maintenance, use, transfer and disposal/discarding		
Maintain, sustain, safeguard, access, traceability and security	DODI28	
Capture, store, compute, disseminate and archive	DODERFM1	
Collection, gathering, evaluation, collation and integration, interpretation and dissemination	JWP8	
Collect, integrate and disseminate	SANDFP3	
Collection, evaluation, analysis, integration and interpretation	SANDFP3	

The following table represents a list of IM related processes. The overlap between the list and discussion in Chapter of the dissertation, the list above and below is easily recognisable -

Table 6.6: Types of Information Management Processes

IM Processes	Source
planning-, managing-, gathering-, capturing-, collection-, compilation-, registration-, processing-, creating-, generating-, compute-, collate-, recorded-, modelling-, analysis-, evaluating-, verification-, controlling-, monitor-, transportation-, transmission, communicated-, reporting-, distribution-, disseminate-, exchange-, released-, storage-, archive-, retrieving-, communicating-, protecting/securing-, sustainment-, integration-, presenting-, flow- and disposal	DODI24 (2, 25, 33 and 35), DODI26 (1, 15, 17, 24, 26, B-2 and B-7), DODI27 (D-1), DODI28 (2 and 5), DODI30, DODI39 (3, 10, 11, 14, A-2 and 3), DODERFM1 (6-1), DODI40 (50), DODI43 (J4-4, J4-6 and J4-8), DODI45 (33), DODI46 (1, 3 and 9), DODI48 (A-1), DODI57, IDODI2 (4, 8, 15 and 27), JDP4 (8, 9, 11, 13, D1-5), JDP9 (1, 8 and 16), JDP12 (5) SANDFO2 (B-1-5, B-1-6, B-1-13 and B-1-16), SANDFP1 (2,3), JWP1 (1-1, 2-12, 2-13, 2A-1, 3-3, 3-5 and 5-4), JWP8 (3A-10, 4-6, 4-10, 4-13 and 5-16) and SANDFP3 (4-3 and 15-3)

From the tables above it is clear that the SA DOD utilises several and various processes to manage the knowledge continuum with. From the literature review (dissertation Chapter 2) most (if not all) of these are also recognised KM processes. This overlap in processes possibly also contributes to the level of construct dissonance currently present. The researcher proposed earlier in the dissertation that the construct of KM be expanded to knowledge continuum management (KCM) which would support the continuous requirement for the integrated management of the various components that are considered part of the knowledge continuum. The construction of a KCM will also provide a platform for the integration of the various sets of processes involved in the management of the various components. For this dissertation, the researcher will, however, focus on the establishment of SA DOD KM as a first and necessary step towards knowledge era thinking and understanding within the SA DOD. Future research may involve the exact structure of a KCM.

A primary question that needs answering is – which are the core KM processes for the SA DOD? As with definitions for knowledge and KM, there is no agreement on the answer to this question. Research could thus be dedicated to answer just this question and to validate the findings empirically. This is suggested for future research. However, this dissertation recommends perceived core KM processes. In order to expand on the fundamentals of SA DOD KM, the researcher discusses some of the identified processes from the selected sample of SA DOD Level 1 policy and doctrine.

Core KM related processes involved in doctrine management are set out in SANDFD2 (1), SANDFO4 (1) and SANDFP2 (1) - “A policy is therefore required that sets out the guidelines for initiating, compiling, authorising, issuing, maintenance and controlling of all [JDP]”.

SANDFO4 (1) states that the SANDF has a doctrine development process, which is close to the core KM process of generating. This process is important because it is used to develop SA DOD capstone military knowledge. SANDFO4 (6) states that Joint Doctrine with significant resource implications must follow the approval route used for SA DOD Level 1 policy and doctrine. SANDFP2 (12-18) describes the exact layout, formatting and development process for JDP. The prescribed process state various KM related processes, such as analysis, the leadership of the doctrine development, approval of the doctrine, distribution, feedback, assessment, review, amendments, register and archiving. DODI31 (15) requires research and development to be conducted on chemical, biological and radioactive doctrine. DODI40 (107) states that operational test and evaluation is used to streamline doctrine (amongst other things during acquisitions). These developments related processes are important because it is used to develop and maintain SA DOD capstone military knowledge.

SANDFO4 (6) states that interim doctrine will be promulgated where there is an imminent need for doctrine that does not exist. This interim doctrine will obviously evolve to become SA DOD doctrine once properly developed after research and analysis of the situation and requirements. It can, therefore, be assumed that the SA DOD regards doctrine to be dynamic; that capstone military knowledge needs to evolve to remain relevant in support of advantage.

Notwithstanding any other KM related process, in order to assist with the continuous improvement (evolution) of SA DOD doctrine, the doctrine is subjected to regular review. JWP1 (4-3) states that - "Continuous intellectual stimulation and in-depth involvement in Corp Com activities across the spectrum, as well as dynamic testing, reviewing and updating of doctrine is necessary to maintain the synergy, understanding and shared intent required for Mission Command.". This is true for all SA DOD policy and doctrine. It calls for continuous engagement with the doctrine and its application in order to adapt, remain relevant and competitive. This is the quest for new meaning that enables understanding as articulated in the definition of knowledge and KM of the dissertation. This is also reiterated by SANDFO2 (2-1-1) that states within the context of fire and rescue doctrine that continuous improvement of both doctrine and policy is required to maintain relevance. JWP4 (1-1) does not call for information renewal but for knowledge renewal, stating -

> "Doctrine has its foundation in history and derives its authority from being the distillation [meaning and understanding] of much hard-won experience [know-how]. Therefore it is enduring [enduring value], but it is not unchanging [dynamic]. Doctrine evolves in response to changes in the political or strategic background, in the light of experience, or as a result of new technology. In turn, it influences the way in which policy and plans are developed …".

This clearly agrees with the notion of a dynamic and complex defence environment that needs responsive, dynamic policy and doctrine to mitigate the deterioration of advantage. There are several other policy and doctrinal statements that support the continuous renewal of doctrine. Renewal can be included in a core KM process – generate. Information is fairly static (a snapshot in time) from the perspective of time and relevance. However, as new information becomes available, and with cognitive processes active, this information can be processed into new meaning that will facilitate new understanding on a continuous basis. DODSPF1 (18) and SANDFP2 (3) call for continuous doctrine renewal in order to ensure accuracy and relevance and to stimulate

knowledge evolution. JWP4 (4-3) states that innovation of ideas is key to doctrine development. JWP1 (1-9) states regarding the generation inclusive of doctrine renewal–

> "[Doctrine] Development is essential for it to remain valid and useful in a constantly changing communication environment. Therefore, users of [JWP1] must constantly strive to challenge the concepts contained in it and actively develop and propose relevant updates and corrections to maintain the necessary dynamism and relevance.".

Contradictory statements between SA DOD Level 1 policy and doctrine exist on the requirement for corporate communications doctrine renewal. DODI1 (4-9) states that corporate communications doctrine must be reviewed annually. In contradiction, elsewhere it is stated that corporate communications policy must be reviewed every 3-5 years (DODI1: 4-37). JWP1 (1-1) states that corporate communication doctrine will remain constant. This is not consistent with theory about knowledge and other policy and doctrine statements discussed above. Knowledge evolves over time as new understanding is generated based on evolving or drastically changing circumstances.

DODI16 (9) states that SA DOD ETD doctrine is the responsibility of Chief of Joint Training and should be reviewed regularly. These statements provide insight into the perceived pace of change within different doctrinal environments. It can be assumed that policy and doctrine within each environment will thus have an evolutionary pace unique to each environment. If the assumption is correct, the SA DOD will require a coherent and integrated KMC to cope with the complexities of these changes.

SANDFP2 (6) states some elements that need consideration for doctrinal review as - "… current doctrine becoming outdated; … new equipment being introduced; ... new methods, procedures or structures being adopted; and … legal or legislative changes".

Stepping of the requirement for doctrinal review, which incidentally is also applicable to SA DOD policy, the researcher discusses in the next paragraphs intelligence-related processes. Universally, intelligence processing is a very important military knowledge capability. This stems from Sun Tzu wisdom – know your enemy as you know yourself – stated in Chapter 3 of the dissertation.

Intelligence should be available to decision-makers and should reach them in time (DODI30:5, also alluded to in DODI31: 15), as follows -

> "d. The collection of information, i.e. overt, covert, electronic and geospatial is regulated and executed effectively, efficiently and economically.
>
> e. The processing of intelligence is regulated and executed effectively, efficiently and economically.
>
> f. The dissemination of intelligence is regulated and executed effectively, efficiently and economically by ensuring that relevant stake holders [*sic*] and decision makers receive CI guidance and support timeously.".

The quote above highlights critical elements of the intelligence cycle, i.e. how intelligence is constructed. It confirms that intelligence is 'something' more than information; from Chapters 3, 5 and this chapter – capstone military knowledge. This is also stated in DODI30 (4-5) - "Employing

an intelligence technique known as "puzzle building", they may then use the information supplied by the [defence community] official(s) concerned to construct intelligence scenarios.". This is nothing else than knowledge acquisition and create. Strangely enough, DODI30 does not provide a definition for intelligence; only for information. JWP8 (4-10) describes the intelligence process/cycle within the context of the intelligence system and IntOps -

> **"**As in all other military operations, a well-developed intelligence system is vital for the conduct of [IntOps] which will shape the conduct of PSO. The [Force Commander], in whom the command responsibility is vested, must drive and direct the conduct of intelligence gathering during PSO as in all military operations. The continuous cycle that includes the direction as provided by the [Force Commander's] Intelligence Problem and the collection, evaluation, collation, integration, interpretation and dissemination of intelligence results, must be controlled by the Management Plan. The organisation of the intelligence staff (J2) must be task-orientated and flexible. It may require augmentation at times to include specialists for the input and analysis of a wider variety and/or specialist fields. The intelligence responsibility of any intelligence structure within a peace mission must also further provide for geopolitical and economic assessments and therefore cover the full spectrum of intelligence support and not just military intelligence. The SANDF [DI] will take a role in fulfilling this need. The flow of information to and from the JOA must thus be guaranteed and provided to ensure comprehensive situational awareness by the decision makers within the mission area and RSA.".

The above quote refers to some important KM related processes – directing (leadership), collection, gathering, evaluation, assessment, collation, integration, interpretation and dissemination (sharing or flow). Another such process referred to above is 'puzzle building'. Due to the fact that intelligence is perceived as capstone military knowledge, these processes are considered fundamental to an SA DOD KMC.

Collation is not only an important intelligence cycle process but important to the construction of a knowledge continuum. JWP1 (2-12) states from the perspective of performance management - "The output of this process is a list of logically grouped items [or information]". This is important for 'puzzle building'.

Let us consider some other processes that are unique to certain policies of doctrine. DODI28 (A-1) offers a definition of what is considered to be engineering – "… process of conceiving, creating, planning and designing works, products, components, systems and processes for useful purposes. The process is based on scientific knowledge, requires synthesis of knowledge and takes into account wider issues.". This definition alludes to some knowledge processes required for engineering but also states that the base of engineering is knowledge, thus linking engineering processes to knowledge. Chief Defence Matérial is responsible for a large portfolio of science, engineering and technology-related knowledge. These processes are thus very relevant for KM within the Defence Matérial Division, Armscor and defence industries.

Other KM related processes also referred to as knowledge flows are knowledge transfer or sharing. There are several statements in the selected sample of SA DOD Level 1 policy and doctrine that preach the importance of data and information sharing. As such, DODI39 (10) states the aim of the SA DOD intranet service (amongst others) - "… to remove information barriers and to enhance info/knowledge sharing.". It also acknowledges the fact that there might be barriers that

result in restricted flow and that these need removal. The removal will have to be within the constraints of SA DOD security policy.

JWP8 (4-9) states the criticality of data sharing for PSOs. SANDFP3 (2-16) states that the sharing of information is essential to the success of Peace Mission Headquarters. DODI39 (11) states that knowledge transfer is important for the training of ICT functionaries. JDP12 (4) states within the context of Batho Phele principles about information –

> "[SA DOD] Officials must at all times give complete and accurate information to clients and/or stakeholders about the services the [SA DOD] renders. Officials must at all times ensure that those who need it receive the relevant information. It must be provided in a variety of media and languages to meet the differing needs of clients and/or stakeholders. [SA DOD] officials must comply with the provision of Promotion of Access to Information Act … when providing information. … Information should be shared and communicated on day-to-day basis between [SA DOD] Officials, clients and/or stakeholders. It should be done through the wide publication of reports, imbizos, internal and external fora etc.".

Thus, the sharing of knowledge continuum artefacts are important within the SA DOD as well as with SA DOD stakeholders; taking strong guidance from the discussion above on security requirement.

DODI1 (1-2) states that the SA DOD supports a - "Two-way Symmetric Communication Model. Two-way symmetric communication promotes an equal and balanced flow of information between the [SA DOD] and its stakeholders where their needs, concerns, interests and values are considered when decisions are made.". Communication is inherent in the core process of knowledge sharing and fundamental to the knowledge creation process (SECI model as an example) to be successful.

DODI26 (12) states that continuous knowledge transfer is important. JDP4 (5-2) proposes that the SA DOD should strive towards being a learning organisation in which information and knowledge are shared freely (obviously within the bounds of the security regime). This acknowledges the differences in information and knowledge and that sharing is applicable to both constructs.

DODI1 (9A-4) links the requirement for training development to knowledge transfer. DODI25 separates the constructs of knowledge, education, training and skills development by stating that knowledge expansion is accomplished by means of education, training and skills development. All of these are essentially knowledge transfer or sharing activities that will somehow have to be integrated into an SA DOD KMC. These statements support knowledge sharing as a core KM process. What is important is that the sharing should provide complete, accurate, relevant (requirement based) information and knowledge. The calibrating factors contribute to the elimination of information and knowledge overload.

IDODI1 (9) provide SA DOD Level 1 policy on the use of blogging and Facebook on social media which are essentially data, information and knowledge sharing instruments for specialists groups, user groups, scientist, technologist, lessons learnt groups, etc. to exchange knowledge continuum artefacts. JWP1 (1-6) states some instruments of use within an operational setting –

"Corp Com assists in shielding and protecting own forces from enemy PsyOps by providing them with rapid, accurate information about the situation in operations, eg [*sic*] by the commander's info briefings, info bulletins, etc". An SA DOD KMC should consider these as possible KM instruments within an integrated capability. Further research should be undertaken to identify other instruments that are critical for knowledge sharing. Another important instrument in knowledge sharing is the media.

Information and knowledge sharing with the other role-players and stakeholders are fundamental to decisions, actions, effects and advantage. JWP1 (1-4) states the role of information and the media -

> "Information about the activities of the SANDF, as revealed by various sources, but especially by the public mass media (including the "new" or social media such as blogging and social networking), has an effect on the level of support for such activities. It is accepted that, as a rule, there will often be a high level of public and media interest in SANDF activities in general and in military operations in particular. Therefore, satisfying the information needs of the public and the media is vital to sustained public support. It is important to note that, although the public mass media play a unique and powerful role in this regard, the use of other direct and indirect means of communication by the government (and the relevant regional or international body) and the SANDF is as important and should not be ignored".

An important process for information and knowledge sharing is mentoring. As was previously stated, mentors are considered important coordinators for the sharing of knowledge and the establishment of a learning organisation. JDP16 (A-6) states that mentoring is –

> "… a process by means of which senior managers or specialists provide information, advice and support to develop junior members/employees. Mentoring focuses on the gathering of knowledge, skills and experience by junior members/employees to higher positions. Mentoring is the process of using specially selected and trained individuals to provide guidance and advice that will help to develop the careers of the protégés allocated to them".

Storage is a core KM process and possibly a sub-process of retention and a vital part of the SA DOD corporate memory. DODI1 also makes mention in several places that data should be stored in digital repositories to ensure accessibility. The selected sample of SA DOD Level 1 policy and doctrine reiterates the storage of information, IM, records management and archiving. These are all closely associated. Based on the definition of SA DOD information, this typically includes data and knowledge. JDP9 (8) states that records management is a subset of IM and closely associated with decision-making and advantage as discussed earlier in this chapter -

> "In the [SA DOD] much of the information will be identified as a [SA DOD] record because it documents [SA DOD] activities or because of the value of the information it contains. Records are fundamental to policy formulation, decision-making, business operations and organisational accountability. The process of records management captures evidence of an organisation's transactions, documents its activities and decisions and provides ready access to this evidence. … Corporate records thus form the stable core of [IM] – reliable, accurate, quality information – taking in records from day-to-day operational systems, extracting and summarising to knowledge-based and briefing systems (and capturing the result), and publishing in different formats to websites, Intranets, publication schema, asset registers. Well-managed records and

> archives are a vital part of the [SA DOD]'s information resources and must be managed within a wider [IM] system to guarantee accurate and up-to-date information, controlled versions, and sustainable corporate memory.".

Also –

> "[IM] describes the means by which an organisation efficiently plans, collects, creates, organises, uses, controls, disseminates and disposes of its structured and unstructured information (information resources) throughout the life cycle of the information, and through which it ensures that the value of that information is identified and exploited to the fullest extent, both in support of its internal operations and in adding value to its service delivery functions. IM fosters the effective use of information for specific business purposes and the maintenance of that information for sharing and recycling inside and outside the organisation.".

The researcher continues the discussion on storage within the context of SA DOD IP management. SA DOD IP is managed as IA. DODI1 (7D-1) states that IP rights are managed by ICA and are there to protect human creativity and ingenuity. DODI23 (7, 9, 15, 16 and 17), DODI24 (D-5), DODI28 (9) state that SA DOD IP must be managed by an IP management system and recorded in a central register (also DODI1: 7D-5 and DODI23: 16 and 17). DODI23 (C-1) describes the various data fields required to be completed in the SA DOD IA register. The registering of SA DOD IP is an important KM process to ensure completeness and accuracy for audit purposes as required by Auditor General South Africa. The SA DOD subscribes to several KM related processes in order to complete this IA register.

DODI23 (7) separates defence matériel related IP and software related IP, primarily because there is a separate policy on SA DOD software management; i.e. DODI23 (ICA management) is DODI24 (software management). DODI24 (B-4) defines SA DOD IP management as - "… , among other things, the identification, acquisition, procurement, registration, maintenance, use, transfer, disposal or discarding of defence [IP]". These two DODIs were developed in parallel. DODI23 (10) states - "leveraging, … funding, maintenance, … registration, ownership and retention, … disposal and transfer, … archive"; DODI23 (22) states - "ownership, management, use and disposal"; DODI23 (28) states "transfer" and DODI23 (10 and 33) states - "…protection" as processes for SA DOD IP management. DODI23 (33) highlights the importance of IP protection. Several of these processes can be considered as core KM processes.

DODI61 (3) states that IP - "… generated in the process of engagements with consultants must as far as possible be contractually retained by the [SA DOD]. Deliverables provided by consultants are the property of the [SA DOD] unless stated otherwise in the contract.". JDP9 (22) states that - "All legal agreements entered into by the [SA DOD] for the purchase of services should clearly state the ownership (including intellectual property rights such as copyright) of any records resulting from the performance of the contract.". These statements speak to knowledge acquisition as a core KM process. DODI57 (B7 and B8) elaborates on various IM processes -

> "[ICS] also includes the organised collection, processing, transmission and dissemination of information in accordance with defined procedures, whether automated or manual, … protection afforded to information systems in order to preserve the availability, integrity and confidentiality of the systems and the information contained within the systems according to affordable security

practices … automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission or reception of vocal, pictorial, textual and numerical data or information ...".

Nothing of value is stated by the selected sample of SA DOD Level 1 policy and doctrine when considering leadership as a fundamental requirement for successful KM and KMC. JDP4 (D1-3) states that one of the qualities of leadership is intelligence. In this context, it is intellect and aptitude. JWP (3A-9) groups intelligence and experience as part of leadership intuition. These statements link the constructs of leadership and knowledge rather than leadership and information and/or IM.

In order to conclude the discussion on KM processes, this dissertation proposes acquire, create, secure, integrate, use, retain, review and share as the core SA DOD KM processes. From the KM processes table above and subsequent discussion and also informed by discussion in Chapters 2 and 3 of the dissertation; 'generate' is not considered a core process because the process is more traditionally linked to data and information generation. Because the researcher supports the ideas of several writers discussed in the literature review (dissertation Chapter 2) – 'acquire' and 'create' are processes linked to knowledge. 'Secure' (or protect), distinctly from a counter-intelligence perspective, is a very important process in the SA DOD as discussed in chapters 3, 5, and earlier in this chapter. 'Integration' is important for the SA DOD due to the different knowledge silos in existence, possibly resulting from attempts to 'organise' knowledge continuum artefacts. 'Integration' is also discussed throughout this chapter and Chapters 3 and 5 of the dissertation an identified as important. 'Integration' is also the driver behind the proposal by the researcher to expand KM into KCM as stated earlier. 'Integration' includes all activities associated with 'organisation'. The 'use' of knowledge is paramount for very obvious reasons but distinctly linked to enhancing decisions, actions, effects and advantage as proposed by the definitions of knowledge and KM in this dissertation. 'Use' refers to the use of knowledge owned by the SA DOD due to knowledge acquisition and creation as well as the 'use' of published knowledge not owned by the SA DOD that is in the public domain. 'Leveraging' knowledge is included in the 'use' as a core KM process. Knowledge 'retention' addresses organisational requirements to archive/store/preserve knowledge for future generations. It is closely linked to knowledge 'security' from a corporate memory perspective. 'Review' and 'sharing' are critical for learning organisations and organisations in a complex environment. Within the limitations set by 'security' as a process; 'sharing' of knowledge is paramount for the SA DOD to gain sustainable advantage. Knowledge 'disposal' is not considered a core process because knowledge never really ceases to exist. 'Disposal' in this sense would refer to a change of ownership, which could be managed as part of 'retention' as a core process. 'Securely sharing' knowledge is in line with entrepreneurial practices and innovation within collaborative ventures.

These processes are not included in the definition for SA DOD KM in recognition of the complexity and fluidity of the defence environment that might require a portfolio of processes from which to choose rather than prescribed rigidity. The proposal also does not represent a linear or sequenced interaction between these processes; but rather a dynamic interaction based on requirement and driven by the need to adapt and evolve.

6.2.4.6 Systems and Sensors

Fundamental to an SA DOD KMC is a clear understanding of what technology and software used by the SA DOD and the integration requirements are. SANDFP3 (6-6) raises the concern about the effect of IT innovation on SA DOD IM and its security. This was discussed earlier in the dissertation and answered positively. Innovation and security dynamics are managed by means of (amongst others) information and business related architecture.

Information architecture (JDP4: D2-12) and business architecture (DODI26: Appendix A -1) should provide the SA DOD with a clear picture of what knowledge continuum artefacts are available, where and the relationship with each other and how these will influence decisions, actions, effects and advantage. Such architecture typically constitutes IM and KM systems and sensors that are fundamental SA DOD IM and KM enablers (or as earlier introduced by the researcher – enablers for KCM). DODERFM1 (6-1) states that SA DOD information systems are used to - "… capture, store, compute, disseminate and archive large volumes of data and information". This confirms the enabling role of information systems to the KM processes for the management of SA DOD knowledge continuum artefacts. In order to do this effectively, efficiently and economically - as a stated requirement from the PFMA and SA DOD policy - the SA DOD IM and KM architecture must be known and integrated with other business processes and systems. To accomplish this, expertise in these functional areas must be available. The integration of systems, sensor and software are fundamental to KM success, will be costly, time- consuming and will require a clear understanding of what knowledge is and how it relates to the KM leadership philosophy of 'the art of knowing and the science of managing that knowledge to obtain and sustain advantage'.

JDP9 (10) states that the SA DOD should effectively use IM and IT expertise (amongst others). This assumes the availability of expertise. JDP9 makes no mention of KM expertise or systems. In fact, none of the selected samples of SA DOD Level 1 policy and doctrine makes mention of such expertise. This is probably a contributing factor to the fact that the SA DOD does not have dedicated KM systems, possibly a result of SA DOD disinterest in KM.

DODI57 (B7) defines an information system as part of the ICS definition, alluding to the requirement for integration discussed throughout the dissertation, as follows -

> "… An inter-connected [*sic*] set of information resources under the same direct control that shares common functionality. A system normally includes hardware [IT], software, information, data, applications, communications and people. It also includes the organised collection, processing, transmission and dissemination of information in accordance with defined procedures, whether automated or manual,…".

The following information systems and sub-systems were identified from the selected sample of SA DOD Level 1 policy and doctrine (a non-exhaustive list): Facility Register System, Management Information Facility, PERSOL, Operational Support Information System, CMIS, GCIS, Distance Learning Support and Information Sub-system, Recognition of Prior Learning management system, HR Contract Management System, ETD Management Information Systems, Financial Management System, Debt Management System, Organisation Information System-, Structure Management Control System-, Defence Information Systems Network, Central Advance

System, Cash Receipt Voucher System, Computer Aided Logistic Management Information System, ARMSCOR Contract Management System, Technical Standardisation System, Operational Support Information System. Defence Information & Communication Infrastructure, Equate System, Occupational Classification System, remuneration system, job evaluation system, Performance Management and Development System, SA DOD Policy Master Records Index, Consultants Management Information System, SA DOD Integrated Strategic Management Enabler (ISME), Safety Web Banking Services, Kaysbank sub-system, Cash Receipt Voucher sub-system , Invoice Administration sub-system, Safetynet, Health Information System, ETD management information system, Combat Information and Communication Systems.[87]

Although the listed examples above are posited as information systems, they will manage data, information and knowledge. It will require further research to correctly classify these systems in order to construct a coherent and integrated KMC that is enabled by these systems. Such research could possibly be part of a future KM readiness audit.

DODI43 (J4-4) states clearly that information systems are to be used to manage SA DOD knowledge within the context of the Senior Management System. No mention is made of specific KM systems. In another paragraph, the senior managers are too - "… create innovative knowledge management solutions …", through the adaptation and integration of information from several sources. This alludes to the requirement for specific KM system(s).

JWP4 (6-1 and 2) and SANDFP3 (15-3) state that – "The basic elements of any Command and Control System, whether Strategic or Tactical, are as follows: Sensor subsystems which gather information about the location, movement and activities of enemy and friendly assets …", amongst other elements. For militaries, it is not just information systems based on IT that provide data/information/knowledge but also sensors of various kinds (e.g. radar, sonar, EW sensors, people, etc.) to inform decisions and action. Furthermore - "Communications links between the Sensors and the Command Centres and between the Command Centres and the forces to permit the rapid transmission of information and commands [decisions]". Information and communication systems (ICT) thus provide the links between the various systems and sensor to enable decisions and actions.

SANDFP1 provides policy on SA DOD Combat Net interoperability. The policy provides much technical detail about the role data plays within the networked communication system (a concept stemming from RMA discussed in Chapters 2, 3 and earlier in this chapter). The data referred to conform to the true meaning of data – referred to as "bit data" – that flows between networked ICT systems and applications. The generation of information and knowledge will be at risk in the absence of unavailability of such data.

JDP4 (D2-7) states the following about MIS –

> "Accurate and accessible information is required to enable effective and accountable decision-making for command, control and management. The [MIS] must improve communication within and between departments and between different agencies and levels of government. … Information requirements should therefore be evaluated, processes must be re-engineered and

[87] (DODI2, DODI1, DODI11, DODI14, DODI15, DODI16, DODI18, DODI21, DODI22, DODI24, DODI30, DODI32, DODI38, DODI40, DODI43, DODI47, DODI48, DODI51, DODI52, DODI53, DODI56, DODI59, DODI61, DODSPF1, FMDI1, JDP1, JDP2, JDP4, JDP16, SANDFO6)

systems redesigned on an ongoing basis to meet the constantly evolving requirements. However, information systems must be standardised and integrated to be economical and effective.".

This policy statement is extremely important from the perspective of systems support to decision-making and leadership (or C2), the requirement for continuous improvement driven by complexity and change and the requirement for integration. It also ties in with the proposed definitions of knowledge and KM. All of these matters have been addressed elsewhere from a variety of perspectives throughout this chapter. JDP9 (3) states that there is a transition from paper-based record keeping to digital record keeping of information. Information and communication systems are the obvious enablers to accomplish this with. This transition is also important to enable a variety of software-related functions that will assist with filtering data, information and knowledge to eliminate or reduce overload. The distinct requirement for systems to evolve with knowledge cannot be overstated.

The researcher continues the discussion the discussion on the requirement for integration. Standardised, integrated systems and algorithmic standards are requirements for synergy. KM systems will have the same requirements. As such, JDP4 (D2-13) states the requirement for a standardised SA DOD MIS. This corresponds to the requirement for coherent and integrated IM and KM. SANDFO6 (1) and SANDFP1 (1) state the criticality of information to achieve interoperability in joint operations and prescribe a specific standard to achieve this with –

"Joint operations between the Services and Divisions in the [SANDF] require the ability to exchange relevant information with respect to the battle space. … This requirement implies the need for and adherence to a common standard … for information exchange between the various Services in order to optimise situational awareness in the theatre of operations. Therefore [Combat Net Interoperability Standard] will be a common standard that will ensure combat net communications interoperability amongst force elements required to operate in joint operations".

DODI39 (1) states that – "The [SA DOD] Intranet provides information that assists [SA DOD] officials to collaborate on business processes that create value for the [SA DOD].". The SA DOD intranet is an important system to a core KM process – i.e. sharing, indirectly supporting other core KM processes such as knowledge acquisition, creation, retention and use.

Databases and data processing is central to an IM and KM systems approach. DODI24 (B-5) states that there is a difference between a data processing system and an information processing system. Both are core systems developed for the information era. They are also core systems that should feed into a KM system. These aspects are reflected in the Figure 6.14 below.

DODI51 makes reference to several types of databases that must be maintained by the SA DOD with regard to financial management and reporting matters. DODI48 (5) states that the SA DOD should maintain a database consisting of Auditor General South Africa reports and associated SA DOD action plans. This database should contain information and knowledge about SA DOD financial and asset management performance and should be integrated with other IM systems that are dedicated to SA DOD performance management discussed above.

DODI2 (3) states that there is a "[Management Information Facility] database". DODI53 (6) states that the SA DOD manages its policy documents with a Policy Publication Database. In fact,

the selected sample of SA DOD Level 1 policy and doctrine used for document analysis in this dissertation is supported by this database. Thus, the database contains capstone military knowledge in the form of policy – and not data. Some of these databases are accessible via the SA DOD intranet.

DODI29 (9 and B-1) identify the SA DOD munition database. This data is important for the control of munitions but also for research and development of munitions. DODI40 (4) states the various information systems that are critical to SA DOD armament acquisition management. Amongst possible others; these are the Financial Management System, ARMSCOR Contract Management System, Technical Standardisation System – RSA Military Standardisation Steering Committee and the Logistic Accounting Systems (Computer Aided Logistic Management Information System and Operational Support Information System).

Information technology is central to database management and data processing and a fundamental enabler to IM and KM. SANDFP3 (xvii and 12-2 and 12-3) states that IT is an important enabler to provide the deployed forces with tactical, operational and strategic information. This supports the idea that IT is a mere enabler to IM and KM and does not constitute IM or KM. SANDFP3 (xvii and 12-2 and 12-3) also confirms the criticality of IT to force adaptability and flexibility in response to change and to most of the IM and KM related processes. DODI22 (5) states the following with regard to macrostructure management –

> "The management of the macro structure [*sic*] is supported by the various organisational life cycle systems, currently the [Organisation Information System] and the [Structure Management Control System]. These information systems are corporately interactive with all the functional systems of the [SA DOD], as well as the data warehouse. The [SA DOD] management information capability (data warehouse) utilises the data of the organisation life cycle systems as their backbone (reference source) to structure management information reports for decision-making by top management".

This quote mentions several types of information systems linked to IM and data management. It also mentions a - "… data warehouse", which is a central repository for management information required for decision-making. This confirms the notion of the interdependency between IT and data management and IM. Again, and linked to the requirement for IM, a requirement is stated for 'management information reports for decision-making by top management'; relaying the impression that top management uses information to base their decisions on. They should be using knowledge. The phrasing of the sentence is possibly a product of information era practices in combination with IM constructs. These issues should be clarified in an authoritative SA DOD taxonomy which should be managed by the proposed SA DOD KMC.

JDP9 (2) states that the SA DOD has an Information Management Governance Framework that lists comprehensively the acts applicable to the SA DOD. This is essentially a database that is accessible by means of IT.

Other information systems mentioned in the selected sample for SA DOD level policy and doctrine are in DODI47 (13) and DODI57 (B-11) and refer to a Logistics Information Management System being operated by the SA DOD and regarded as a product system; DODI56 (23 and 60) refers to the responsibility of Joint Training to make an ETD IM system available which must

integrate with PERSOL (personnel IM system of the SA DOD) and DODI43 (D-2) states that data is captured on the SA DOD PERSOL system (personnel information management system). DODI52 and DODI8 confirm the importance of PERSOL as personnel management software supported by an extensive database. JDP 3 states throughout the policy the importance of IT to distance learning in the SA DOD. JDP3 (H-1) states that Military Qualification system is an important component of the PERSOL system discussed earlier. These are SA DOD ICT systems that enable HR management and other functions.

JDP9 (16) identifies record keeping as a sub-system of IM - "The [SA DOD]'s primary record system is a manual paper based [*sic*] record system. However, the DOD shall implement an electronic record system (integrated as part of an Enterprise Content Management System …". JDP9 (2) states the SA DOD policy on record keeping –

> "10. It is [SA DOD] policy to
> a. create, maintain, and preserve information as records, in any medium, that document the transaction of business and mission in wartime and peacetime to provide evidence of [SA DOD] organisation, functions, policies, procedures, decisions, and activities; [establishing and maintaining the SA DOD corporate memory]
> b. establish and maintain a [SA DOD] records management system to manage all records, effectively and efficiently through the records life cycle in compliance with regulatory framework; and [based on sub-paragraph (a) above, this is a knowledge base]
> c. maintain a [SA DOD] Archives for the custody of [SA DOD] records identified for permanent preservation because of historical, legal, research or public interest value" [establishing and maintaining the SA DOD corporate memory].

In sub-paragraph (c) the value is calibrated. What is concerning is that doctrine and IP are not included in sub-paragraph (a) and that, military operations are not included in the calibration in sub-paragraph (c). The value of these knowledge continuum artefacts does not increase over time, only a particular intrinsic value to a select audience/client. These records do form a significant military knowledge continuum and corporate memory. The record keeping system thus contributes through research to policy, doctrine, intelligence formulation and other initiatives. What is not stated explicitly is the fact that these records also contain knowledge and not just information. It leaves the question open – when does knowledge become information. It is for this reason that the researcher supports a knowledge continuum rather than a hierarchy to allow the user of the artefacts room for interpretation.

All these systems aim at IM and not KM because KM is not yet practised by the SA DOD. However, these are important building blocks towards an SA DOD KMC. JDP9 (8) states that -

> "Corporate records thus form the stable core of [IM] – reliable, accurate, quality information – taking in records from day-to-day operational systems, extracting and summarising to knowledge-based and briefing systems (and capturing the result), and publishing in different formats to websites, Intranets, publication schema, asset registers. Well-managed records and archives are a vital part of the [SA DOD]'s information resources and must be managed within a wider [IM] system to guarantee accurate and up-to-date information, controlled versions, and sustainable corporate memory.".

JWP8 (5-9) states the requirements for intelligence systems to enable the intelligence cycle discussed earlier in the dissertation - "Warring factions may be located through the employment of intelligence, surveillance and reconnaissance systems linked to command, control, communications and intelligence systems.". This refers to systems that enable C^4I^3SR. The statement also creates the impression that intelligence is collected in the form of intelligence, which might be misleading. Intelligence systems (sensors, software and people) might collect data, information and/or knowledge (intelligence) which is then subjected to the intelligence process to create new intelligence or to add to the accuracy of existing intelligence. The intelligence systems are enablers in the same manner as IT enables IM and KM. Consider the following statement – "A variety of fixed-wing airborne sensors can see beyond a border without infringing it. [ELINT] can provide data on potential threat weapon systems and their compliance with agreements." (JWP8: 5-16). ELINT systems thus provide data, not intelligence. This data is subjected to the intelligence cycle to create intelligence that will support decisions, actions, effects and advantage. ELINT makes use of sensors to collect the data. Thus sensors are part of the systems used to create intelligence or capstone knowledge. With all said, Figure 6.9 is a graphic representation of systems and sensor overlaid on the proposed knowledge continuum discussed earlier -

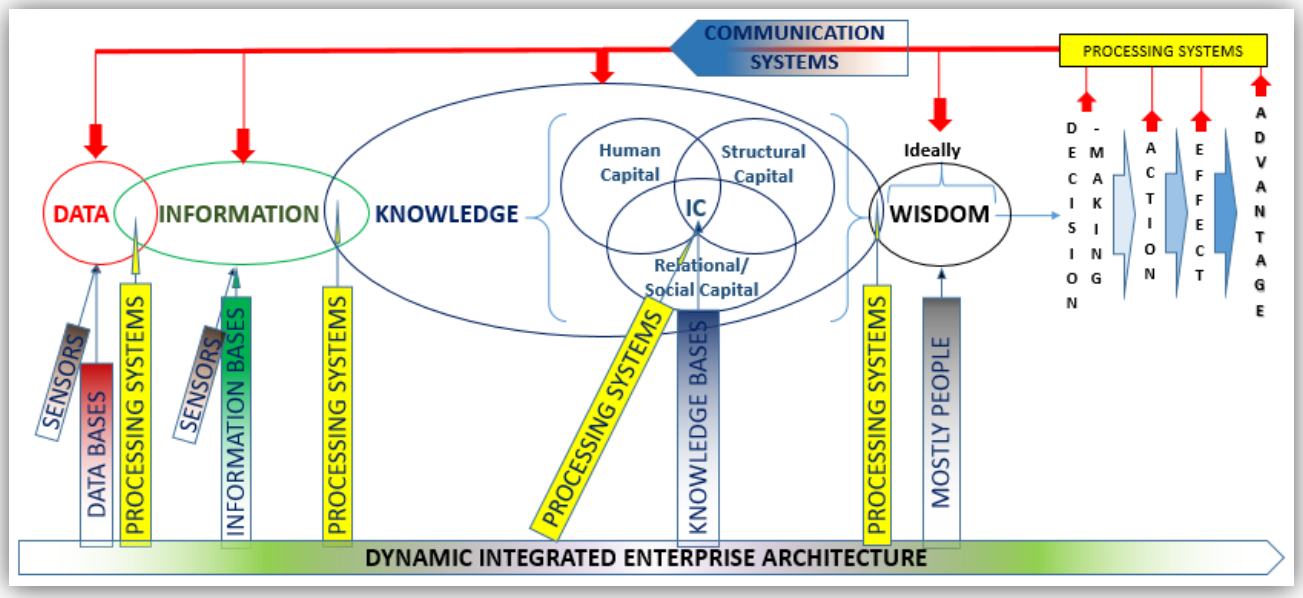


Figure 6.9: Illustration of the Systems and Sensor Interaction with the Proposed Knowledge Continuum

Source: Authors compilation of information and proposed for SA DOD KMC and KM.

SANDFP1 (2) names the DEISM plan as a critical enabler to integration, providing an - "… integrated [ICS] Departmental view and a realistic single execution mechanism of all [ICS and Services] initiatives, programmes, projects and requirements in terms of both the investment and maintenance portfolios".

The SA DOD Strategic Planning Framework makes reference to – "Information/Knowledge Management Systems" (DODSPF1: 22) as a heading for two paragraphs and then proceed to detail the requirements for the SA DOD Integrated Strategic Management Enabler (ISME). The ISME, however, is still under development, but once operational will enable SA DOD –

> "… planning, budgeting, reporting and risk management functions thereby ensuring a strategically focused [SA DOD]. The [SA DOD] ISME will enable the alignment between departmental outputs, budgets and risks supported and enabled by a sound reporting system to ensure performance reporting/evaluation and identification of deviation to plan. The development of the [SA DOD] ISME during the MTEF period and beyond will see the phased-in implementation of key focused strategic elements of the planning, budgeting, reporting and risk management process with an initial primary focus on [SA DOD] performance information management, and reporting. … The [SA DOD] ISME will at it's [*sic*] core, ensure the enhancement of Departmental information systems which will enable the effective and efficient utilisation of state resources in support of the [SA DOD] mandate and support to Government MTSF priorities. The continuing enhancement of the [SA DOD Performance Information Management] function, amongst others, through the development of the [SA DOD] ISME, will ensure the accuracy and auditability of Departmental performance information as a basis for the development of the Defence Chapter of the annual [Estimate of National Expenditure], and subsequent subordinate planning, budgeting, reporting and risk management functions within the [SA DOD].".

The manner in which the heading to these quoted paragraphs is constructed wants the reader to believe that IM is equal to KM and that the SA DOD actually does KM. Furthermore, the policy-user is to believe that there is a KM system in place in the SA DOD (or at least being constructed) – in the form of the ISME. This implies that the various fundamentals discussed thus far are in place. However, the ISME is only going to focus on SA DOD performance IM and reporting, which are lagging indicators. It does not give the researcher a sense of integration with other IM systems such as those in the list above and others mentioned throughout the chapter. Also, it does not mention the integration of SA DOD policy, doctrine, intelligence and IP as examples of capstone military knowledge. From the quote above it would seem that ISME is an IT system that would enable IM for performance reporting purposes. The fact that it is labelled strategic just speaks to the nature and extent of the information it will process. It could thus be considered a strategic enabler to the SA DOD. The researcher is doubtful that intelligence systems will be integrated into the ISME (for example). It is positioned to inform decision-making and action. However, it is by no means an integrated SA DOD KM system that would provide a platform for coherent and integrated KM. The ISME will, however, provide a valuable platform for an SA DOD KMC once operational.

DODI26 represents SA DOD policy on business process management. The policy mentions a - "… core knowledge repository" (DODI26: 3), within the context of a proposed Integrated Enterprise Architecture Solution, with which to accomplish SA DOD business process management. If this knowledge repository does not end up as an 'information warehouse' it might just be the beginning of 'knowledge thinking' in the SA DOD. However, without being informed by an authoritative taxonomy on at least the constructs addressed in this dissertation, implementation will be difficult. The proposed Integrated Enterprise Architecture Solution will also have to integrate with all the other SA DOD data management, IM and possible KM systems listed above, as well as other that, might not have been addressed in the selected sample of SA DOD Level 1 policy and doctrine. As stated earlier, this will be a costly and time-consuming venture that will require clear leadership, dedicated funding, policy and doctrine as guidance for it to be successful. As with the ISME, the Integrated Enterprise Architecture Solution will, however, provide a valuable platform for an SA DOD KMC once operational. A dynamic integrated

enterprise architecture is included in Figure 6.9 above to indicate the requirement for such architecture to be able to manage the SA DOD knowledge continuum.

6.2.5 A Conceptual SA DOD Knowledge Management Model?

Having considered KM theory, KM in the military and SA DOD related legislation, policy and doctrine the researcher recommends the establishment of an SA DOD KMC. The researcher proposes the following broad descriptive and conceptual KM model, consolidating the fundamental aspects of military and related knowledge as identified by the dissertation in support of the establishment of the proposed SA DOD KMC. The proposed model can graphically be presented as follows:

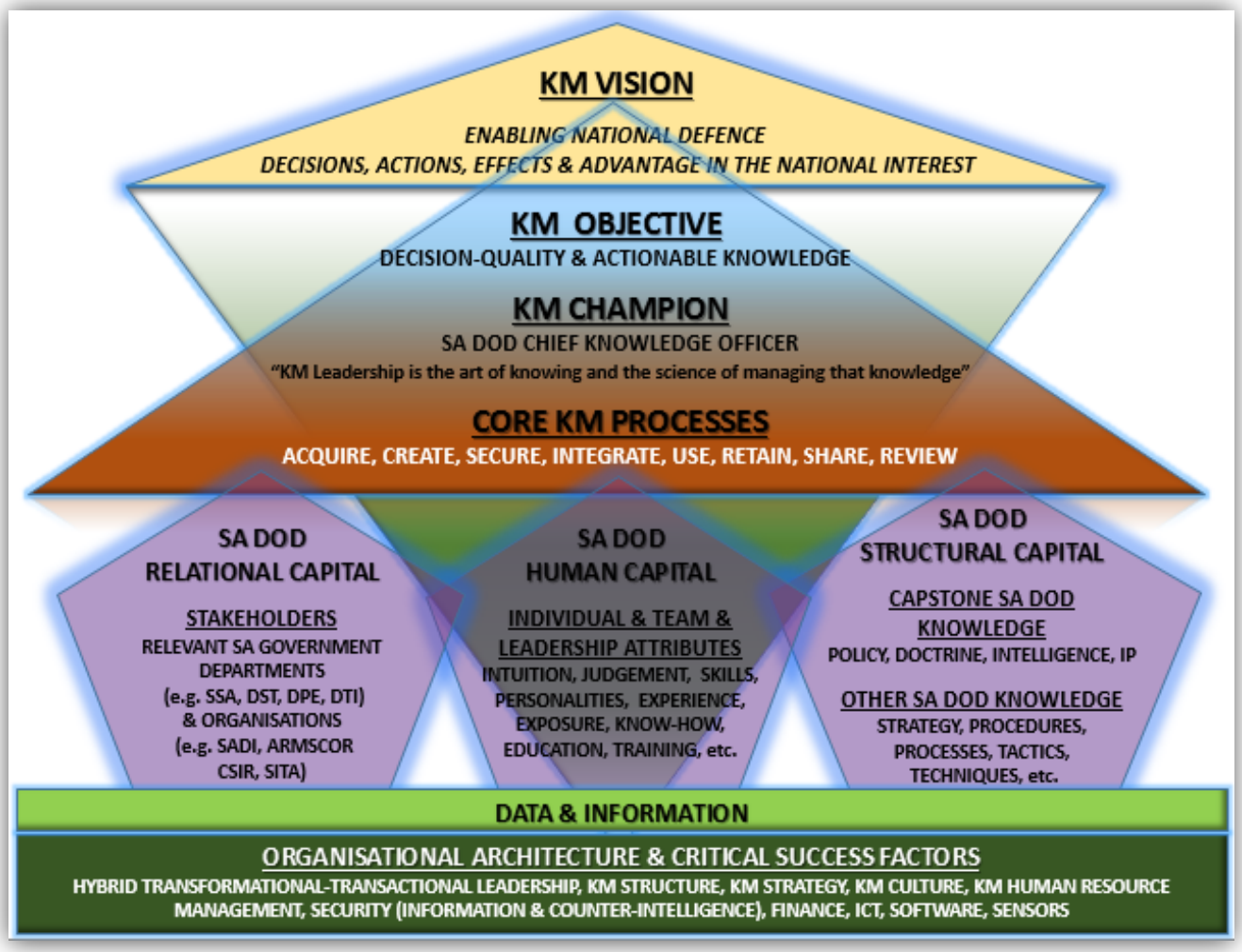


Figure 6:10: Proposed SA DOD Knowledge Management Model

Source: Authors compilation of information and proposed for SA DOD KMC and KM.

The concept is based on a firm foundation and a number of spearheading triangles and pentagrams that simulate progress and leadership. The foundational rectangle is solid in colour and texture indicating the requirement for structural and organisational strength. The triangles and pentagrams are transparent and overlapping to indicate the requirement for coherence and integration.

The KMC vision is based on the mandate of the SA DOD and the ubiquitous requirement for decisions, actions, effects and advantage to serve the national interest. The KM objectives are to provide decision-makers and executers with decision-quality and actionable knowledge.

The KMC should be led by a Chief Knowledge Officer influenced by the proposed KM philosophy of 'the art of knowing and the science of managing that knowledge to obtain and sustain advantage'. This philosophy should provide inspirational guidance as to the requirement of decision-makers 'to know' rather than just being 'informed'. It also dictates the use of scientific methods to manage the SA DOD knowledge continuum in order to achieve coherence and integration on an enterprise scale.

Core processes and fundamental resources have been included in the model in order to provide a baseline from which flexible solutions can be crafted. The model does not propose any lines of communication or action (i.e. C2 relationships) or feedback loops. The researcher assumes that in a dynamic environment these relationships will change causing instability to the broad perspective of SA DOD KM. These decision-making and process flows can be delineated in detail with future research once a thorough knowledge audit has been completed. It is, however, important to understand from a broad perspective what impact SA DOD KM.

The pentagrams contain descriptions of the SA DOD IC, which is considered SA DOD knowledge. Internally, the SA DOD should lead, structure, fund and enable (IT) KM initiatives to facilitate decision-making and actions in support of national security and defence interests. This is done through the DR 2015, policy, doctrine, intelligence and IP – implemented through various strategic planning and management processes and resources. These elements of structural capital are developed and managed by people that contribute human capital to achieve this and facilitate the crafting of relational capital.

Once these are in place and practised, it should be understood that the SA DOD IC is impacted by the external environment. Key role-players are the SA government (national policy and legislation – e.g. the IPR act); SA Defence Industry (a key military knowledge developer and manager), ARMSCOR (the sole contractor for SA military matériel knowledge described by SA DOD policy), CSIR (the key research institute generating and managing military knowledge and SITA (the sole software development and management agent for the SA government and thus the SA military). The external environment will have its own KM models with which it manages SA DOD relevant knowledge. If not, the SA DOD can minimise its risk by taking cognisance of possible vacuums in the external environment and mitigating that risk by constructing mechanisms within its own organisational and structural IC to make sure SA DOD owned IC is managed accordingly.

SA DOD IC is supported by the various and several types of data and information managed by the SA DOD with core KM processes but also more specific processes tailored to the requirements. The proposed conceptual SA DOD KM model is supported by the proposed definitions for SA DOD knowledge and KM and a KM leadership philosophy.

6.3 CONCLUSION

Coherent and integrated management of knowledge by an SA DOD KMC will not solve all the consequential SA DOD challenges resulting from a continuously changing future. However, very few challenges will be solved without knowledge, thus, rendering the notion of not managing the SA DOD knowledge continuum unfathomable.

The researcher's assumption that the SA DOD is not interested in KM is thus based on the fact that the SA DOD still finds itself managing its resources and capabilities based on information era principles. The SA DOD regards information as a strategic resource to base decisions on. In the knowledge era, the SA DOD should regard knowledge as the strategic resource and asset. In several instances, the SA DOD links information to decision-making, action and military advantage. The SA DOD does not afford this position to its knowledge and thus creating the perception that knowledge is not important. This predicament manifests itself at the strategic, operational and tactical levels, both within the corporate and operational environments. These practices are possibly fuelled by construct dissonance saturating the selected sample of SA DOD Level 1 policy and doctrine.

The SA DOD does not have SA DOD Level 1 policy and doctrine on KM; a product of the dilemma outlined above. The SA DOD thus has no strategic guidance and direction on KM. However, there is wide-ranging policy on several of the components of a KMC – with no clear mechanism to bring these together in an integrated KMC. Compounding the situation further, wide-spread construct dissonance is prevalent within the selected sample of SA DOD Level 1 policy and doctrine. Starting with the definition for SA DOD information; the dissonance relates to the interchanged and incorrect usage of data, information and knowledge as constructs. Construct dissonance severely hamper the coherent and integrated management of these resources. This construct dissonance is probably also a large contributing factor to the SA DOD being entrenched in the information era and associated management practices. The level of construct dissonance and the negative effects thereof strongly supports the researcher's assumption that the SA DOD is not interested in KM. It also supports the recommendation that the SA DOD should institutionalise coherent and integrated KM to align the SA DOD with the requirements for knowledge era thinking and practices and an authoritative SA DOD taxonomy on these (and possibly others) constructs.

There is much evidence from the selected sample of SA DOD Level 1 policy and doctrine that the SA DOD should consider having a KMC. This need is based on the complexity of the SA DOD environment, both from a corporate perspective (Defence Secretariat) and an operational (SANDF) perspective. There is substantial evidence that SA DOD capstone knowledge should drive decisions, actions, effects and advantage in every sphere of the organisation. Fortunately for the SA DOD, the organisation owns a diverse portfolio of capstone military knowledge and defence related knowledge. Unfortunately, the SA DOD does not have a KMC, a knowledge champion such as a CKO nor KM policy and doctrine with which to manage this portfolio of knowledge within the interest of decisions, actions, effects and advantage and ultimately the national interest.

The SA DOD knowledge portfolio includes capstone military knowledge such as policy, doctrine, intelligence and IP. Fundamental and foundational to SA DOD KM are coherence, integration, security, leadership, stakeholder and role-player management, processes, funding,

organisational structure, HRM and IT. Databases, information- and knowledge-bases and their associated management systems and architectures are several and varied – providing substance to the recommendation for coherent and integrated SA DOD KM by means of a KMC.

Based on the discussion thus far in the dissertation, the researcher proposes that KM as a construct be expanded to knowledge continuum management (KCM) which would support the continuous requirement for the integrated management of the various components that are considered part of the knowledge continuum. It will also provide a platform for the integration of the various sets of processes involved in the management of the various components. This proposal could be part of future research; for the SA DOD, however, establishing a KMC is the first step.

In the next chapter, the researcher provides an analysis of the primary data collected by means of questionnaires. Because of the seminal nature of this research, the questionnaires were aimed at the SA DOD senior management based on the C2 regime within the SA DOD that controls function, structure and resource allocation. If no interest in KM is detected and supported at this level of management it will permeate the entire SA DOD. Thus, the analysis of this data will focus on the level of interest and application of KM within the SA DOD. Very little interest was detected.

CHAPTER 7

ATTITUDES AND VIEWS OF RESPONDENTS ABOUT SOUTH AFRICAN DEPARTMENT OF DEFENCE KNOWLEDGE MANAGEMENT

7.1 INTRODUCTION

A questionnaire research technique were chosen to collect data/information/knowledge in support of a deeper inquiry into the perceived disinterest in KM by the SA DOD. A selected sample of SA DOD leadership was chosen to participate in the questionnaire research. Since this research is seminal, it is paramount to start the research at the leadership level of the SA DOD. This is based on the, now established principle, that leadership is fundamental to KM success. Thus, any interest shown by the leadership of the SA DOD is pivotal to its success.

Respondents were selected based on the criteria set out in Chapter 4 (research methodology). Also, as discussed in Chapter 6 of the dissertation, DODI43 details the KM requirements for senior management in the SA DOD. Therefore, based on the prescripts of SA DOD Level 1 policy, all senior managers should be able to actively engage in KM within their areas of responsibility and be in a position to provide opinions and answers on the questions raised in the questionnaire based on the KM definition used by DODI43 – "Obtains, analyses and promotes the generation and sharing of knowledge and learning in order to enhance the collective knowledge of the organisation"(DODI43: J4-4).

The first round of questionnaires was issued to the respondents on 13 October 2016 to be returned by 28 February 2017. The completed questionnaire was scanned and stored with the other material used for the writing of this dissertation. A copy of the questionnaire and research agreement is attached as Appendix B to the dissertation.

Due to the poor response rate from the first round of questionnaires the researcher was compelled to issue a second and third round of questionnaires to a broader sample (more detailed explanation is provided later in this chapter). Whereas the first round focussed exclusively on the top layer of SA DOD SMS members (16 selected members based on discussion and findings in chapter 6); the second round broaden that focus to all SA DOD members (a total of 275 possible respondents, with the lowest number of possible respondents, 202).

The focus of the questionnaire research remains to extract SA DOD leadership perspectives on SA DOD interest in KM, understanding of KM importance and possible methods to execute KM within the SA DOD. The first round of questionnaires could only marginally establish a disinterest in SA DOD KM. The second and third round confirmed the results of the first round as well as the assumption made by the researcher that the SA DOD leadership, and hence the SA DOD, does not have interest in establishing coherent and integrated KM. Furthermore, currently, the SA DOD leadership has a very limited understanding of KM. This predicament is possibly the lead contributor to the SA DOD still being in the information era as discussed in Chapters 5 and 6 of the dissertation. Also, the predicament will severely hamper the establishment of an SA DOD KMC in order for the SA DOD to benefit from coherent and integrated KM as discussed in Chapters 2 and 3 of the dissertation.

7.2 RESULTS FROM RESPONSES

7.2.1 First Round of Questionnaires

Leadership drives successful KM as was discussed in Chapters 2 and 3 of the dissertation. The sample focussed on the on the executive management level of the SA DOD commonly referred to as the Senior Management System (SMS). The sample thus included rank/appointment levels of Director General, Chief, Deputy Director Generals and one Chief Director. This resulted in a sample of 16 SMS members.

Leadership and direction of SA DOD resources are initiated and accounted for by this selected sample. They are responsible for the management of SA DOD knowledge. Some expression on the requirement for KM in the SA DOD does exist within the selected sample of SA DOD Level 1 policy and doctrine (JDP20 and DODI43), which provides limited evidence that the SA DOD might be interested in adopting KM as a management practice. JDP20 makes mention of KM in a diagram that summarises the competencies required from personnel at various levels of the SA DOD. Knowledge management is pitched at the executive management level or what is commonly referred to as the Senior Management System (SMS) (JDP20: 12). DODI43 (J4-4) elaborates on the Generic Core Management Criteria, Standards and Criteria for SA DOD SMS and their responsibility towards KM.

It was thus important to ascertain from this sample insight on their conceptualisation and management of the resource, whether this is done or not. The Chief Director is included in the sample due to the direct responsibility in the drafting of the Defence Review 2015 and its implementation. Because the Defence Review 2015 is a primary source document analysed in Chapter 5 of the dissertation, the researcher thought it prudent to include this appointment in the sample.

Supporting the researcher's initial assumption, very limited interest was shown by the selected sample of SA DOD SMS members. During this first round of questionnaires, the researcher purposefully did not engage the selected respondents on progress and intention to submit so as not to artificially raise interest or pressure. The result was only one of the questionnaires returned to the researcher completed by an SMS member that is at the level of Deputy Service Chief, which was accepted as being endorsed by the invited participant and thus accepted as the opinion of the invited participant. Two questionnaires were returned stating no interest in completing it. Staff Officers of at least three Chiefs telephonically communicated with the researcher to clarify the requirements for the questionnaire and the intention thereoff, clearly tasked to complete the questionnaire as delegated. None of these reached the researcher. Thirteen questionnaires were not returned with any level of comment. The very weak response rate reflect any or combinations of the following scenarios –

- The questionnaire assumes that the respondents have knowledge on KM, which might not be the case, thus leaving the respondents intimidated by the questions.
- The work schedules of the SMS members not allowing time for participation in academic research on the SA DOD.
- No interest by SMS members to get involved in academic research on the SA DOD.

- No interest by SMS members in the subject field.
- Possibly perceiving academic research of this kind as a waste of time.
- Personal Staff Officers to these positions managing the staff work for the SMS members not being responsive enough to meet the deadline.
- Personal Staff Officers to these SMS members perceiving this kind of academic research as a waste of time and thus not presenting it to their principles for consideration.
- At least one SMS member had family emergencies during the period which probably complicated work and family responsibility even more.

The very limited response received obviously hampered the extraction of themes. However, the one response received was recorded. The following is a verbatim copy of the response received -

Question 1: To your knowledge, in which era is the world currently (e.g. agrarian era, industrial era, information era, knowledge era)?

Respondent 1A: "The world is captured in all four the eras. Certain areas in Africa are stuck more in the survival mode. Some are in an agrarian era with failed industrial capability. In South Africa, the Public Service is still in the information era and not really ready to embark in the knowledge era."

Question 2: In your opinion, is the DOD a complex organisation?

Respondent 1A: "Yes, the DOD is a complex organisation dependent on members from different Services and Divisions, all from different backgrounds, highly dependent on communication with each other."

Question 3: In your opinion is information and/or knowledge strategic to the DOD? If so, why?

Respondent 1A: "Yes, both are extremely essential. Information is derived from a myriad of acts and data, which floods the DOD daily. Knowledge is derived from years of experience and learning. The DOD is losing a lot of this knowledge basis, due to retirements and normal attrition. A loss of knowledge and experience which is happening, will hamper the formulation of proper strategies."

Question 4: Does your Performance Agreement have a distinct requirements statement for Knowledge Management?

Respondent 1A: "No."

Question 5: To your knowledge, are there any legislated requirement for Knowledge Management in the SA DOD?

Respondent 1A: "I am not aware of any."

Question 6: Is Knowledge Management addressed in the Defence Review 2015?

Respondent 1A: "Not aware of it. Possibly addressed indirectly in Chapter 11."

Question 7: Are you aware of any SA DOD Level 1 policy and/or SA DOD doctrine or strategy that address Knowledge Management in the SA DOD?

Respondent 1A: "No."

Question 8a: Do you have any opinions, based on personal experience and/or work experience that supports the view that the SA DOD is interested in doing Knowledge Management and/or are actively engaged in Knowledge Management?

Respondent 1A: "No drive to implement it to my knowledge."

Alternatively, the following question was considered.

Question 8b: Why, in your opinion, is the SA DOD not interested in KM? Stated differently, why in your opinion has the SA DOD not adopted a coherent or integrated KM?

Respondent 1A: No comment by Respondent A. Respondent A opted to answer Question 8a above.

Question 9: In your opinion, should the SA DOD engage in Knowledge Management (if not already doing Knowledge Management)? If so, why would this be important for the SA DOD?

Respondent 1A: "It is essential to apply KM due to the ever-changing military environment with all its challenges and complexities."

Question 10: How would you define knowledge?

Respondent 1A: "The ability to analyse and interpret information in order to make the right decision in time."

Question 11: How would you define knowledge management?

Respondent 1A: "The collection of information, critically analysing the info and making the right decision at the right time."

Question 12: What knowledge do you manage within your portfolio?

Respondent 1A: "Managing of a number of health disciplines (+64) and supporting elements."

Question 13: What is considered capstone SA DOD knowledge? Is this described in SA DOD Level 1 policy or doctrine?

Respondent 1A: "Not aware of such a policy or doctrine. This can never be singular knowledge in this complex department. Synergy will have to be found between the two Level 1 Entities, Sec Def and CSANDF."

Question 14: What type of knowledge should the SA DOD be managing? In your opinion, why this type of knowledge?

Respondent 1A: "Embedded knowledge to face war-like challenges. Tactical knowledge of roots level is also important to survive war-like situations. This, with experience can lead to proper strategic decision making."

Question 15: What approach should be used to manage SA DOD knowledge with (e.g. resource-based approach or risk management based approach or competitive advantage based approach or etc, etc)?

Respondent 1A: "Listen to, and share experience and knowledge of members who still remain in the DOD."

Question 16: What should the aim/goal/objectives of KM be in the SA DOD?

Respondent 1A: "To close the gaps that exist between role-players, communication and knowledge. To exchange knowledge and share experiences."

Question 17: In your opinion, what should be the critical components/elements of an SA DOD Knowledge Management model?

Respondent 1A: "Knowledge audit and Peer reviews."

Question 18: What Knowledge Management processes exist in your domain?
Respondent 1A: "Health and clinical information. CPD-Clinical Professional Development opportunities. MOU/MOAs with stakeholders such as Tertiary Institutions."

Question 19: Based on your experience, is there a requirement for more knowledge integration?
Respondent 1A: "Yes, providing the huge gap in communication between involved entities can be resolved."

Question 20: What do you think should be key components of an SA DOD KM model?
Respondent 1A: "Workshops/sessions. Video conferencing. Research."

The single response confirmed many themes that emerged from the other findings throughout the dissertation. Respondent 1A clearly agree with the requirement for SA DOD KM, stating clearly that knowledge is of strategic value (i.e. "to face war-like challenges" and "to survive war–like situations") and essential to the organisation to cope with complexity and continuous changes in the environment. Respondent 1A states unequivocally that integration is required to accomplish this. This is consistent with perspectives identified throughout the dissertation. However, Respondent 1A confirms that the SA DOD is not ready to embrace the knowledge era yet; acknowledging the data/information overload experienced by the SA DOD whilst slowly losing much of the IC inherent in experience when people retire. If the SA DOD were managing its knowledge coherently and in an integrated manner, the organisation would have policy, strategy and plans formulated to harness the strategic value of knowledge and to secure knowledge whilst allowing for normal personnel management practices such as retirement. This is not likely to occur soon as the DR 2015 does not prescribe any coherent and integrated KM or KMC for the SA DOD.

Part of the management gap is locked up in the fact that KM is not included in performance agreements. Respondent 1A states that he/she is not aware of this being a requirement. In fact, Respondent 1A goes as far to state that there is no organisational effort to implement KM. This is probably based on no legislative, SA DOD Level 1 policy and doctrine requirement to do so. It could also be due to no leadership in establishing KM in the SA DOD. Probably both.

Respondent 1A defines knowledge as an ability rather than the product of processes and also link knowledge to decision-making and a time-value. However, in defining KM, Respondent 1A reduce the phenomenon to the management of information with just two specific processes. The same approach is evident in the literature review prescribing an assortment of processes to accomplish KM with. The approach is endemic to the organisational proficiency in IM. Importantly, Respondent 1A include decision-making and timing as important variables in the definition of KM.

Respondent 1A name a number of KM and associated processes of importance such as analyse, interpret, collect and share. These have been discussed at length throughout the dissertation. A specific goal of KM is articulated by Respondent 1A - "To close the gaps that exist between role-players, communication and knowledge. To exchange knowledge and share experiences." – thus, acknowledging critical components of KM and positioning KM to be the binding agent between them. The researcher agrees with this perspective by describing it as 'facilitating' in the proposed KM definition.

Respondent 1A name knowledge audits and peer reviews as critical components of a possible SA DOD KM model. The researcher agrees with this view in the sense that these might be specific processes or tasks performed by an SA DOD KMC and possibly prescribed and elaborated on in Level 1 policy.

7.2.2 Second Round of Questionnaires

The second round of questionnaires was initiated based on the poor response rate from the first round. Also, the poor results of the first round only marginally confirmed the researcher's assumption that the SA DOD is not interested in KM.

As was stated in the introduction of this chapter, the sample was broadened to include all SA DOD SMS members. However, due to command and control restrictions in the SA DOD, the researcher still had to distribute the questionnaires via the command structures. The questionnaire completion also remained voluntarily. The targeted sample in the second round of questionnaire constitutes the entire SA DOD leadership cadre. It includes –

- Level 16 (Director General and General) – two (2).
- Level 15 (Deputy Director General, Lieutenant General and Vice Admiral) – nineteen (19).
- Level 14 (Chief Director, Major General and Rear Admiral) – fifty-two (52).
- Level 13 (Directors, Brigadier General and Rear Admiral (JG)) – two hundred and two (202).

This constitutes a total sample of 275 potential respondents. If these respondents systematically delegated the task to lower levels it results in a total sample of potential respondents of 202. In at least one instance the request for respondents to the questionnaire was discussed on a senior management forum[88]. At least two other instances a staff officer was tasked to manage any responses for their respective Divisions (these were in the matériel and operations environment. These instances are known to the writer because these staff officers contacted the researcher to confirm the requirement and that the request is receiving attention. Responses were received as follow –

- Level 16 – zero (0).
- Level 15 – zero (0).
- Level 14 – one (1).
- Level 13 – zero (0).

This indicates that staff administration took place. However, the level of interest in contributing to the research was virtually null. It could also be construed as no interest in SA DOD KM. The results support the results of the first round of questionnaires, pointing to at least the following:

[88] SA DOD Financial Management Board in 12 December 2017 – (File Ref. CFO/522/1/1 – Minutes of the Financial Management Board).

- The first and second layer of the SMS band has no/little interest in completing/participating in the research and hence no interest in SA DOD KM.

- Due to the lack of interest in the research and SA DOD KM, the questionnaires were not distributed to lower levels of the SMS band.

- The questionnaires were not distributed to lower levels of the SMS band due to the period of the year that it was attempted in – being the festive period with associated vacation leave (10 December 2017 – 20 January 2018).

- The questionnaires were distributed to each level of the SMS band but attracted no interest in participating.

Again, the very limited response received hampered the extraction of themes. The one response received was recorded. The respondent answered the questionnaire as follows (a verbatim copy of the response received) -

Question 1: Why is the SA DOD not interested in KM?

1.1 In your opinion or to your knowledge is there interest KM and evidence thereof in the SA DOD in?

Respondent 2A: "I am of the opinion that there is a definite interest in the DOD in this regard. The problem, however, is that all efforts are scattered, managed on requirement bases of individuals or smaller interest groups and not integrated what-so-ever. A good example is that financial systems are not aligned and speaking to logistical systems. Interest is therefore focused on individual requirements/preferences to ease problem-solving that are experienced during the execution of tasks. Higher order systems were also developed to enhance productivity and output e.g. FMS and CALMIS."

1.2 Does your and/or your direct superior's Performance Agreement have a distinct Performance Requirements Statement for KM?

Respondent 2A: "None that I am knowledgeable about."

1.3 Are you aware of or to your knowledge is there any SA DOD policy, strategy or doctrine that express on or govern KM?

Respondent 2A: "If there are, I am not knowledgeable about such documents or guidance."

1.4 Are you aware of or to your knowledge is KM an RSA legislated requirement?

Respondent 2A: "No."

1.5 Are you aware of or to your knowledge is KM addressed in the DR 2015?

Respondent 2A: "I cannot recall that I have seen anything in this regard."

Question 2: Why should the SA DOD be interested?

2.1 To the best of your knowledge, what do you understand knowledge to be?

Respondent 2A: "I define knowledge according to Bloom's Taxonomy which ends at Level 6: Evaluation."

2.2 In which era is the world currently in your opinion or to your knowledge?
Respondent 2A: "Knowledge era."

2.3 In your opinion or to your knowledge, is the DOD a complex organisation?
Respondent 2A: "Definitely."

2.4 In your opinion or to your knowledge, will the quality of decision-making, action, effects achieved and advantage be affected if these activities are based on data vs information vs knowledge?
Respondent 2A: "As soldiers, we have been taught to do appreciations. During this process you first have to acquire the facts, then analyse each and every fact in isolation and then in relation to one another in order to come to real knowledge, understanding and finally to establish a new synthesis for the solving of the problem. If this is not done, you will arrive at sub-standard solutions. To my opinion – this is what KM is all about – contextual information that takes relationships with other environments into consideration to finally add value in order to make the best possible decisions. So yes, effectiveness and efficiency should increase – if not the bases for planning is flawed."

2.5 In your opinion or to your knowledge, is data and/or information and/or knowledge strategic to the DOD?
Respondent 2A: "Strategic in the military has its own meaning – I, therefore, would say that it is vital or critical to the DOD on all levels of functioning from the tactical, to operational to strategic level and from the day-to-day management environment to the operational environment, and finally from the 'as is' environment to the future environment."

2.6 In your opinion or to your knowledge, should the SA DOD engage in KM initiatives?
Respondent 2A: "I am of the opinion, as mentioned above, that we have already engaged in KM activities in the past. These may range from rudimentary debrief reports, to Accountability Management Conferences where 'knowledge' is managed on a monthly bases and compared with previous years, to PERSOL, CALMIS, and FMS systems. Archiving, storing information on computer drives specifically developed for this purpose, etc are additional methods to manage info. There is a constant drive in the DOD to ask the 'So what?' question – facts and data are just not enough to come to answers any longer. Computer programmes are constantly enhanced to convert data and facts into meaning that is required."

3: What type of knowledge should the SA DOD be managing?

3.1 In your opinion or to your knowledge what type of knowledge should the SA DOD be managing?
Respondent 2A: "One of the biggest lessons learned by information based forces of the First World is that too much info and info dissemination to the wrong levels is just as good as no info at all. In the Knowledge Era, we can easily be overwhelmed by too much info/knowledge. So the too simple answer to the question would be: Manage info that is required to plan, direct, orchestrate and control the objective achievement of the specific environment/level and have access to info/knowledge that has an impact/direct relation to that environment. This is where

complexity will once more come to the fore as all the different level's requirements and how they relate to one another should be integrated into the broader organisational KM system. This principle will then give rise to the system of systems approach."

3.2 What knowledge do you manage specifically within your portfolio?
Respondent 2A: "Day-to-day management knowledge that spans the POSTEDFITB (personnel, organisation/structure, sustainment, training, education, doctrine facilities, information technologies and budget/finance), as well as operations knowledge both internally and externally of the RSA."

4: How should the SA DOD manage its knowledge?

4.1 In your opinion or to your knowledge, what should the aim/goal/objective of KM be in the SA DOD?
Respondent 2A: "To make quick, in time, informed decisions based on 'correct' available and tailored knowledge that will enhance the effectiveness and efficiency of the DOD at large, now and in future."

4.2 In your opinion or to your knowledge, what KM processes exist in your domain?
Respondent 2A: "Mostly those aspects mentioned above."

4.3 In your opinion or to your knowledge, is there a requirement for more knowledge integration?
Respondent 2A: "If you read the abovementioned – it is the main challenge we are experiencing at present – all is disjointed and managed in an ad hoc fashion. In my opinion, therefore, protocols and policy should follow a top-down approach while populating the knowledge base should follow a bottom-up approach."

4.4 In your opinion or to your knowledge, what do you think should be key components be of an SA DOD KM model?
Respondent 2A: "Governance, people, processes, technology, structure, culture and security."

The single response from round two confirmed many themes that emerged from the other findings throughout the dissertation. The opinion of Respondent 2A that the SA DOD is interested in KM is contested by the dissertation from the perspective of no appointed KM leadership, governance, culture and structure to execute it with. Respondent 2A provides some insight into the existence of KM activities and processes. The researcher agrees with these, as discussed in chapter 6 of the dissertation.

Respondent 2A confirms the importance of integration amongst what is perceived as KM systems and practice. This theme has surfaced continuously throughout the dissertation. It is considered to be a critical variable if KM success is the goal. The researcher is in agreement with this perspective and thus included this variable into proposed definitions and the SA DOD KM model.

There is explicit recognition of the knowledge era by this SMS level respondent, which begs the question why the DR 2015 does not recognise this. Respondent 2A also makes mention of the POSTEDFITB acronym within the context of the specific knowledge portfolio managed by him and

provide an explanation of what is understood by it. Interestingly, Respondent 2A does not mention the anomaly of capstone knowledge missing from this acronym (i.e. policy, intelligence, IP – amongst possible others) and equate the 'I' and 'T' to information technology. Respondent 2A briefly mentions Bloom's Taxonomy within the context of the question on how knowledge can be defined. Bloom's Taxonomy of Learning is depicted in the following graphic:

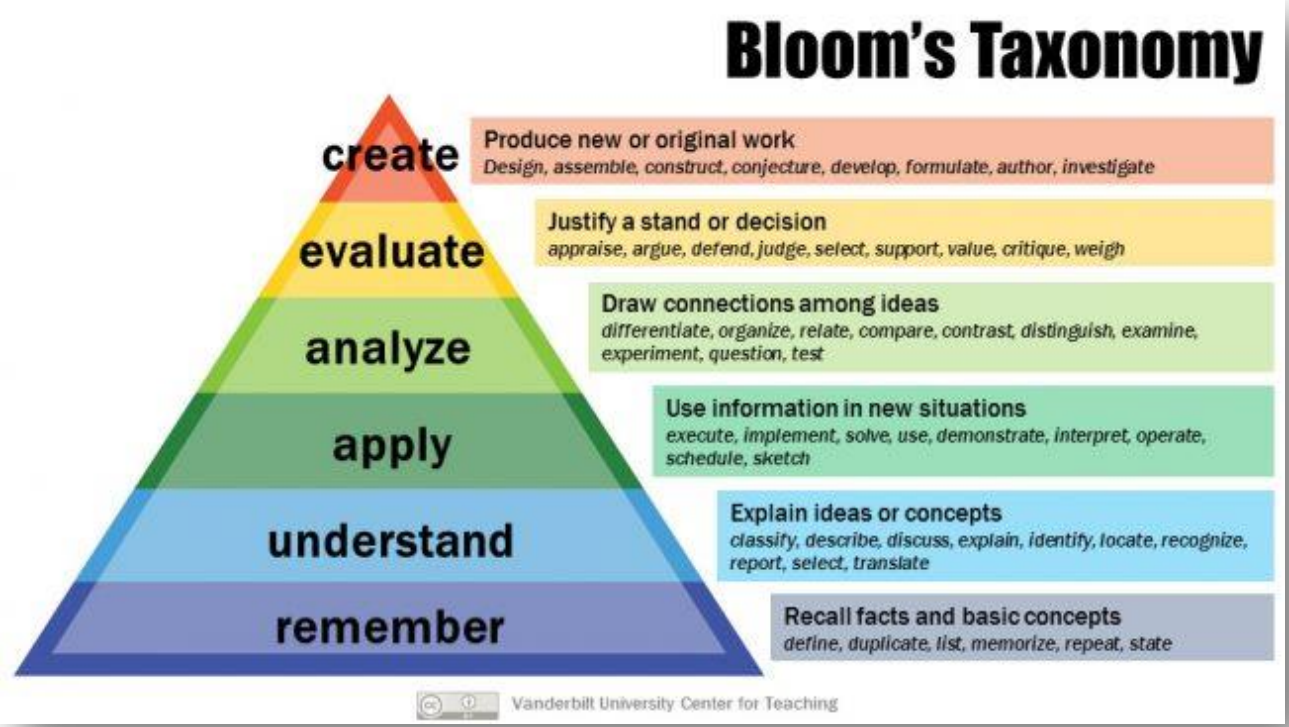


Figure 7.1: Bloom's Taxonomy of Learning

Source: Vanderbilt University. (2018). Retrieved from https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/ on 31 January 2018.

The original Bloom's Taxonomy saw the light of day in 1956. The Taxonomy was originally used by educators and consisted of six primary categories: "…Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation". Knowledge was separated from the other categories with the classification of the other categories as skill and ability; clearly projecting knowledge to be the "…necessary precondition for putting these skills and abilities into practice." (Vanderbilt University, 2018: online)

In 2001 the Taxonomy was revised to be a tool for "…Teaching, Learning, and Assessment". It was thus not intended to be a definition for knowledge but rather a framework to guide the development of knowledge, skill and ability. The revised Bloom's Taxonomy (2001) was rendered to be more dynamic and positioned to facilitate action. It is understood that knowledge forms the bedrock of the six cognitive processes (i.e. remember, understand, apply, analyse, evaluate and create). The categories are as follows:

- "Remember: Recognizing and Recalling.
- Understand: Interpreting, Exemplifying, Classifying, Summarizing, Inferring, Comparing and Explaining

- Apply: Executing and Implementing.
- Analyze: Differentiating, Organizing and Attributing
- Evaluate: Checking and Critiquing
- Create: Generating, Planning and Producing" (Vanderbilt University, 2018: online)

The revision of the Bloom's Taxonomy also included a taxonomy detailing the knowledge types involved in the cognition process. These knowledge types are as follows:

- "Factual Knowledge: Knowledge of terminology and Knowledge of specific details and elements.
- Conceptual Knowledge: Knowledge of classifications and categories, Knowledge of principles and generalizations, and Knowledge of theories, models, and structures.
- Procedural Knowledge: Knowledge of subject-specific skills and algorithms, Knowledge of subject-specific techniques and methods, and Knowledge of criteria for determining when to use appropriate procedures.
- Metacognitive Knowledge: Strategic Knowledge, Knowledge about cognitive tasks, including appropriate contextual and conditional knowledge, and Self-knowledge". (Vanderbilt University, 2018: online)

These types of knowledge fit into the IC concept. Several of these types of knowledge are also recognised as such by other authors (see Chapter 2 of the dissertation; Table 2.2 and Figure 2.4 as well as Table 2.1). Understanding is a key step in the taxonomy to be able to create knowledge and facilitate further understanding to get to meaning. Linkages with action and decision-making are also clearly visible in the processes of 'apply' and 'evaluate'. This is thus a very useful model with which to understand how knowledge is used in teaching. It does, however, not define knowledge or KM specifically. It does display some (if not most) of the elements inherent in this dissertations' proposed definition of knowledge and KM.

A critical process missed by most literature on KM is security. Respondent 2A specifically mentions this process amongst a number of others. This gap was identified and discussed by the researcher at length and confirmed by the respondent based on his extensive military experience. The other key components for a proposed SA DOD KM model are "Governance, people, processes, technology, structure, culture". These are reflected in the proposed conceptual SA DOD KM model.

The general prognosis still prevails, after the second call for participation in the research that the SA DOD SMS band is not interested in participating in the research and/or is not interested in SA DOD KM. Thus, with the SA DOD leadership not interested in KM it is highly unlikely that SA DOD KM takes place (at least not in an integrated manner). The need for integrated SA DOD KM was, however, expressed explicitly by both the respondents above; thus admitting that it does not take place but remains a critical requirement for decision-making and action.

A final round of questionnaires was initiated in order to verify this prognosis and to mitigate the effects of the festive period and vacation leave period during the response period (10 December 2017 – 20 January 2018) provided.

7.2.3 Final Round of Questionnaires

The final round of questionnaires was initiated based on the exceptionally poor results of the second round of questionnaires. After receiving one (1) completed questionnaire and one (1) enquiry about the questionnaire during the second round the researcher proceeded with a final round of questionnaires.

The final round of questionnaires was distributed to mitigate the risk that the period provided for completion of the second round of questionnaires (10 December 2017 – 20 January 2018) received little or no consideration by the command bodies listed in the distribution list.

The sample remained the same as was used for the second round of questionnaires, i.e. SA DOD SMS members. The researcher again distributed the questionnaires via the command structures as per the distribution list attached to the questionnaire. Questionnaire completion also remained voluntarily.

After distribution the researcher received enquiries about the preferred format of the completed questionnaire from the following environments; confirming the SA DOD communication distribution system function fairly effectively:

- Senior Staff Officer from Chief of Joint Operations on 23 January 2018.
- Senior Staff Officer from SA Army Human Resource Management on 29 January 2018.
- Senior Staff Officer from the Chief Human Resource Management office on 29 January 2018.
- Director from the Chief Defence Matériel Division on 5 February 2018.

Responses were received as follow –

- Level 16 – zero (0).
- Level 15 – zero (0).
- Level 14 – zero (0).
- Level 13 – zero (0).

This confirms no interest further interest by the sample (other than the two responses already recorded) in completing/contributing to the research and/or SA DOD KM. The results support the results of the first and second round of questionnaires. The final round also eliminates anomalies created by the festive and leave periods (10 December 2017 – 20 January 2018). The result confirms that the SMS Level 16 and SMS Level 15 have no or unexpressed interest in completing/participating in the research and hence probably no interest in SA DOD KM. Due to the lack of interest in the research and SA DOD KM, the questionnaires were possibly not distributed to other levels of the SMS band (Levels 14 and 13). However, if the questionnaires were distributed to each SMS level, such distribution did not attract any interest in participating. This supports the assumption of the researcher that the SA DOD has no interest in coherent and integrated KM.

After three rounds of questionnaires and the very limited response received the assumption by the researcher that the SA DOD has no interest in coherent and integrated KM is supported. This hampered the extraction of themes and other conclusions in support of the document analysis in the previous chapters. This level of interest displayed will also hamper severely hamper any future attempt to implement KM initiatives in the SA DOD and will require considerable change management. However, the researcher did make some inferences from the two questionnaires received and from 28 years' experience as an employee in the SA DOD. The following section is a discussion of the themes that could be extracted from the completed questionnaires of those respondents that voluntarily participated.

7.3 THEMES

The following is the views of the researcher, calibrated with the opinions expressed by the two respondents.

7.3.1 Why is the SA DOD Perceived not to be interested in Knowledge Management?

Leadership drives successful KM, both from a human capital (leaders) and structural capital (legislation, policy and doctrine) persepctive. Based on the participation in the research by the SMS strata of the SA DOD and the two responses received, the researcher's assumption that the SA DOD is not interested in KM is supported. This predicament is further exacerbated by not having KM included in the legislation, DR 2015, SA DOD Level 1 policy and doctrine and/or performance criteria in SA DOD Senior Management performance agreements. Yet, SA DOD Level 1 policy states that KM should be practised by senior management. The extent of KM not being included in performance agreements can be ascertained with an SA DOD knowledge audit.

Knowledge management theory and practice have been under development for more than 15 years. Yet, the SA DOD still finds itself in the information era expressed so in the DR 2015 - contributing to the perception that the SA DOD is not interested in KM.

Thus, by combining no performance requirement with being entrenched in the information era the perception of not being interested in KM is supported, albeit at the SA DOD Senior Management level. Interest in KM should also be validated for every level in the SA DOD with more research. However, without SA DOD Senior Management sponsorship and leadership, coherent and integrated KM will not be successfully implemented.

7.3.2 Should the SA DOD Consider Knowledge Management Implementation and Why?

The world is currently in the knowledge era. This requires a more integrated approach to managing the conceptual knowledge continuum. Because the SA DOD is exposed to (possibly severe) data/information overload, serious consideration should be given to the correct management approach that supports decision-making, action, effects and advantage. This dissertation propose KM as one possible solution.

Both SA DOD information and knowledge are regarded as strategic to the SA DOD, driving the essential requirement of managing; stemming from requirements emanating from complex military environments and the fact that the SA DOD is considered a complex organisation. Complexity spawns dependence on communication, experience and learning to survive and thrive.

Another reason for KM implementation is a requirement stated for "synergy' between the two primary components of the embedded case study – i.e. the Sec Def and CSANDF. Because of the emphasis placed on knowledge sharing as a KM process, KM will go a long way to provide coherence and integration between these organisational components.

The ability of the SA DOD to craft strategic direction (e.g. policy, doctrine and strategy) is dependent on recognition by the SA DOD that knowledge is a strategic resource that should be managed accordingly. Linked to the fact that knowledge is regarded as strategic - is the predicament of knowledge loss by the SA DOD, which is then linked with the ability of the SA DOD to craft strategic direction (e.g. policy, doctrine and strategy). A clear requirement for knowledge integration was expressed.

7.3.3 What Type of Knowledge should be managed by the SA DOD?

Health and clinical related information and knowledge, as well as a Memoranda of Understanding with stakeholders (e.g. tertiary institutions), were identified. Also, more generic, knowledge that is embedded in the SA DOD ensuring the survival of the organisation during a war. It, therefore, highlights previously discussed requirements for survival. However, no mention was made of advantage.

The very limited responses received made it difficult to add much detail to this question. However, the DR 2015 and a selected sample of SA DOD Level 1 policy and doctrine provided comprehensive insight into the portfolio of knowledge to be managed. A future knowledge audit will verify and augment this picture further. No mention was made of intelligence, IP or contracts as capstone SA DOD knowledge.

7.3.4 What are the Fundamentals that the SA DOD must understand about Managing Military and Related Knowledge?

The respondents indicated that the definitions of knowledge and KM should at least make reference to process. The definitions should also be linked to decision-making and the time-value of the knowledge continuum. Another important factor to consider is knowledge sharing as a fundamental objective of KM. Additional to this, knowledge audits and peer reviews were proposed as critical elements of SA DOD. Knowledge management tools such as workshops, video conferencing and research were identified. Mention was made of the requirement for knowledge security by one of the respondents, highlighting the fact that security is associated with knowledge.

7.4 CONCLUSION

The chapter provides supporting evidence that the SA DOD is not interested in KM. This is based on lack of interest in the subject field and lack of interest in leading KM initiatives by the selected sample of SMS members, and lack of legislative, policy and doctrinal KM imperatives. Most of this is probably driven by the fact that the SA DOD is still entrenched in the information era and associated management practices. The lack of response to the questionnaire is attributed to lack of interests in the subject field and/or academic research related projects, congested work schedules, staffs filtering the requirement for the research out of the work schedule of their superiors, staffs not responsive enough and other personal reasons. Without clear leadership and structural capital in place KM will not be allowed a foothold in the SA DOD, nor will it be successfully implemented. This will negatively affect the SA DOD's ability to survive and to secure an advantage.

In the last chapter the researcher compares and discusses the research findings from the literature review (dissertation Chapter 2), military KM (dissertation Chapter 3); legislative framework and DR 2015 (dissertation Chapter 5), SA DOD Level 1 policy and doctrine (dissertation Chapter 6) and questionnaires and analysis (dissertation Chapter 7). The comparative analysis and discussion lead to possible solutions to the research questions. Thus, Chapter 8 finalises the dissertation with concluding remarks on implications for KM theory and practice as well as proposals for future research.

CHAPTER 8

CONCLUSION, CONTRIBUTION AND CLOSURE

8.1 INTRODUCTION

Knowledge and KM, as constructs, are fiercely debated subject fields internationally and will remain so for the immediate future. Knowledge management is still, and will remain for at least the short-term, a contentious management science due to the nature of the asset proposed to be managed and the divergent contexts it is managed in.

Knowledge as a construct derives its configuration from context, mostly driven by individualised aspiration to know and/or organisational reach for advantage. Context is interpreted by an infinite portfolio of human values, norms, culture, experience, skills, judgement, intuition, etc. Every individual and organisation have a different portfolio endowment, reinforcing the notion that knowledge is in constant flux and hence the requirement to manage it.

There is still no definitive definition for knowledge or KM, probably due to the dynamic nature of knowledge and contextual dynamics. Context, stemming from environmental complexity and change, and knowledge as well as what is required to manage it with are continuously evolving. Managers should thus construct the best contextual solutions to manage knowledge within their organisations in order to survive and attain and multiply advantage.

The purpose of this research was to qualitatively explore, describe and assess the extent to which KM would be beneficial to the SA DOD and how this could be achieved. The objectives of this research were structured according to four secondary research questions that explored the perception that the SA DOD is not interested in KM; provide possible arguments why the SA DOD should be interested in KM; suggest possible fundamentals to managing SA DOD knowledge as well as the identification of SA DOD knowledge that needs managing.

Deductive reasoning was used, resulting in an extensive literature reviews with a broad scope including a small international case study on military KM as practiced in the USA military; document analysis based on relevant RSA legislation, the DR 2015 and a selected sample of SA DOD Level 1 policy and doctrine, and lastly a questionnaire aimed at the opinions of SA DOD Senior Management.

During the research, the researcher moved from the generally accepted KM theory and concepts to specific applied thinking on the functioning of KM within the USA military, as a recognised world-class military organisation, followed by specifics regarding KM within the SA DOD. From the document analysis (primary research focus) and questionnaires (secondary research focus), the researcher concluded that the SA DOD is not interested in KM for various reasons. Amongst such reasons are the extremely poor interest in participation by the SA DOD SMS level in the questionnaire research; there are no legislative requirements for SA DOD KM, thus not necessitating any management action on the matter and probably fuelling the disinterest; no mention is made of KM as a requirement in the DR 2015 thus further reinforcing the disinterest in responding to the requirements for KM in the knowledge era; no recognition that organisations

have transitioned into the knowledge era, starting as far back as the early 2000s with the transition. The afore mentioned reasons probably contribute or is the cause of the predicament that the SA DOD does not have Level 1 KM policy - yet there is at least one Level 1 policy that states the requirement for KM to be formalised in SMS performance agreements.

The researcher constructed robust arguments from published literature and organisational documents supporting the importance of KM in general as well as the importance of KM for militaries from a USA military perspective and for the SA DOD. The USA military was used as a case study because of the availability of published material that could be analysed and assessed against other academic material. The findings of the dissertation could possibly be generalised to militaries of similar size and complexity as the SA DOD.

In general, take note of proposals by the researcher regarding a knowledge continuum as a construct rather than a knowledge hierarchy as well as proposals regarding knowledge continuum management rather than just KM. Military theorists can also take note of the proposed KM leadership philosophy which the researcher based on the definition of missions command.

8.2 CONSOLIDATED REVIEW OF THE CHAPTERS

8.2.1 Chapter 1 – Introduction, Background and Objectives of the Research

The chapter introduced the context for the dissertation, describing the problem statement, purpose statement and objectives of the dissertation and outlined the research questions, limitations and ethical considerations for the research. The primary research question for the research was - What is the extent of disinterest in, benefits and requirements for coherent and integrated KM in the SA DOD? Answers to these questions will achieve the research objective. Secondary research questions are as follows:

- *Question 1: Why is the SA DOD perceived not to be interested in KM?* This question is based on an assumption drawn from the lack of evidence of SA DOD KM.
- *Question 2: Should the SA DOD consider KM implementation and why?* Following from the first question the researcher elaborates on the importance of SA DOD KM and why.
- *Question 3: What categories and types of SA DOD knowledge should be managed?* It is important to discover what categories and types (subject fields) of knowledge exist in the SA DOD and which of these should form part of SA DOD KM in support of coherence and integration.
- *Question 4: What are the fundamentals that the SA DOD must understand about managing military and related knowledge?* Important factors discussed relate to processes, security, coherence and integration, leadership, enabling systems, etc. These fundamentals informed the construction of an SA DOD KM conceptual model.

8.2.2 Chapter 2 - Literature Review: Knowledge Management Theory and Practice

A literature review of the primary KM theory relevant to the SRQs 2 to 4 was done; concluding with important factors for consideration in later chapters of the dissertation. Secondary research question 2 to 4 was answered satisfactorily from a general theory and business perspective.

The chapter considered knowledge and the management thereof with a wide angled lens. It was established that the world is in the knowledge era and that organisations institutionalise KM as a management enabler to manage organisational knowledge. It was concluded that KM is not project management, operations management or IM, but that these are distinct processes that both utilise and generate knowledge which then needs coherent and integrated management to unlock advantage with. Business organisations lead the development of KM, both theoretically and practically. Clear evidence was provided as to the requirement for KM in business, most of which is also relevant to military organisations due to the generic impact of decision-making, actions, effects and advantage on both business and militaries. This evidence mostly relates to the strategic nature of knowledge as an organisational asset and the competitive advantage it offers. What makes the management of knowledge ambiguous is the fact that there is no universally accepted definition for the construct. This makes defining KM as a construct very difficult.

Organisations that seek to manage knowledge will have to define the construct for their environment and then define what KM means and must achieve for their organisation. This will assist organisations to ponder questions on what knowledge to manage, how to manage these and to what end. This dissertation provides insight into these generic aspects in Chapter 2 and expanding the arguments in Chapter 3 with a conclusion on the importance of KM for militaries and definitions for SA DOD knowledge and KM.

8.2.3 Chapter 3 – Literature Review: Military Knowledge Management

There is unambiguous recognition of the value proposition of KM for militaries in some foreign countries, particularly the USA. Chapter 3 focused on KM in the military, mostly from the perspective of the USA military KM experience. This chapter can be considered as part 2 of the literature review, albeit with a document analysis character because the research material mostly constituted USA military-related documents and some published articles.

A literature and document review of the primary military KM theory relevant to the SRQs 2, 3 and 4 was done; concluding with important factors for consideration in later chapters of the dissertation. Secondary research question 2 about the reasons why the SA DOD should consider implementing KM was answered satisfactorily from a USA military KM perspective. Secondary research question 3 about the categories and types of knowledge should be managed by the SA DOD was answered satisfactorily from a USA military KM perspective. Secondary research question 4 about the fundamentals that the SA DOD must understand about managing military and related knowledge was answered satisfactorily from a USA military KM perspective. The chapter stated without argument the importance of KM to militaries. The chapter identified some fundamentals for KM in the military, mostly corresponding with findings from the literature review (dissertation Chapter 2).

The USA military clearly positions themselves in the knowledge era and have institutionalised (probably with varying levels of success) KM as a strategic management enabler. Identified as critically important are leadership, funding, organisational structure, taxonomy, KM policy and strategy, integration, etc. Furthermore, policy, doctrine, intelligence and IP are identified as capstone military knowledge, actively managed by the USA military. The USA military clearly links knowledge and the management thereof to decision-making, actions, effects and advantage.

The chapter also identified a definition for KM as used by the USA military as well as several knowledge processes that were considered for a proposed SA DOD KM model. These and theoretical aspects identified in Chapter 2 of the dissertation were used by the researcher to propose working definitions for SA DOD knowledge and KM as a basis for the SA DOD document analysis in Chapters 5 and 6. This should lay the foundation for a future SA DOD KMC and provide the starting point for coherent and integrated SA DOD KM. With a clear understanding of what the SA DOD should regard as knowledge and KM, the researcher embarked on an embedded case study on the SA DOD, focussing on related legislation, policy and doctrine and senior management opinion.

8.2.4 Chapter 4 - Research Design and Methodology

A qualitative research methodology was selected as the most suitable method due to the seminal nature of the dissertation and due to the requirements for deep enquiry. The researcher took a relativist worldview (ontological assumption), calibrated with a constructivist paradigm (epistemological assumption), favouring a qualitative research methodology and case study research approach/design that rendered the rich description of the phenomenon using techniques such as document analysis and a questionnaire. The foundation for the discussion about SA DOD KM was laid with descriptive and exploratory literature reviews (dissertation Chapters 2 and 3). Chapter 3 constituted a limited (open source documents) case study on military KM focussing on the USA perspective.

Based on the composition of the SA DOD, an embedded single case study approach was used for document analysis of selected and relevant legislation, the DR 2015 and a sample of SA DOD Level 1 policy and doctrine. The SA DOD embedded case study explored several layers of management direction and imperatives. This allowed for consideration of research material from both the Secretariat for Defence and the SANDF.

The document analysis (chapter 5 and 6) was supplemented with a questionnaire research (chapter 7), directed at the SA DOD SMS to extract more insight about SA DOD interest in KM and other perspectives on KM fundamentals. This approach was based on the fact that KM will not be instituted nor be successful without support from the organisational leadership. Deeper insight into the interest in and/or actual SA DOD KM initiatives was accomplished with both document analysis and questionnaires. However, the very limited response received from the questionnaires only provided evidence that supports the assumption that the SA DOD is not interested in KM from a leadership perspective.

8.2.5 Chapter 5 - Legislative Framework and DR 2015

The chapter focused on the document analysis of relevant legislation and the DR 2015 to determine the manifestation of KM theory and practice in the SA DOD that would shed light on all the research questions; concluding with important factors for consideration in Chapters 6 and 7 of the dissertation. Secondary research question 1 about the SA DOD interest in KM was answered partially from the perspectives expressed in various legislation and the DR 2015. Secondary research question 2 about the reasons why the SA DOD should consider implementing KM was answered partially. Secondary research question 3 about the categories and types of knowledge should be managed by the SA DOD was answered partially. Secondary research question 4 about

the fundamentals that the SA DOD must understand about managing military and related knowledge was answered partially.

The legislative framework relevant to the SA DOD and the SA DOD DR 2015 is silent on the requirement for KM. In fact, the documents are relatively quiet on all matters concerning knowledge. The legislation and DR 2015 are still entrenched in the information era. The regulatory and policy perspectives expressed by the documents promote information as the strategic resource to be managed and secured. The absence of legislation regarding the requirement for KM is probably the driving force behind the perceived SA DOD disinterest in KM. This is further exacerbated by the DR 2015 that endorses the information era entrenchment and IM focus for the foreseeable future. The documents analysed did, however, provide much insight into why KM is important for the SA DOD and why the SA DOD should consider establishing a dedicated KMC.

The documents also rendered evidence that supported the proposed definitions for SA DOD knowledge and KM. The identified gap in the literature about knowledge security is addressed in the documents with great emphasis, albeit from an information security perspective. Several fundamental requirements for KM have been identified in the documents as well as categories and types of knowledge to be managed by a proposed SA DOD KMC. Fundamental requirements identified early in the dissertation already were also present in the documents, expressed within various contexts, but all supporting the requirement for coherent and integrated KM.

8.2.6 Chapter 6 - SA DOD Level 1 Policy & Doctrine

Chapter 6 focused on the analysis of a selected sample of SA DOD Level 1 policy and doctrine that shed light on all the research questions and contributed in the crafting of the questionnaire and the findings of the dissertation.

Chapter 6 is a document analysis of the manifestation of KM theory and practice in the SA DOD from the perspective of a selection of Level 1 policy and doctrine documents. Chapter 6 aimed at providing answers to SRQs 1, 2, 3 and 4. Secondary research question 1 about the SA DOD interest in KM was answered satisfactorily. Secondary research question 2 about the reasons why the SA DOD should consider implementing KM was answered satisfactorily. Secondary research question 3 about the categories and types of knowledge should be managed by the SA DOD was answered satisfactorily. Secondary research question 4 about the fundamentals that the SA DOD must understand about managing military and related knowledge was answered satisfactorily.

The researcher found that the selected sample SA DOD Level 1 policy and doctrine is paralysed by construct dissonance, specifically the constructs data, information, knowledge (including policy, intelligence, doctrine and IP as forms of capstone military knowledge). Critical to this dissonance is the acceptance by the SA DOD that information is defined as being inclusive of data and knowledge. This, combined with no legislative requirement for KM is probably the backbone of the perceived SA DOD disinterest in KM.

The SA DOD has extensive Level 1 policy and doctrine on IM. None is available for KM. Very limited policy expression on what knowledge and KM is, is present in the selected sample. The expressions that are present are of very little use. It is probably this dissonance (a possible

product of ignorance of the subject matter and poor attention to detail in policy writing) that conceals the requirement for KM. Arguments could also be tabled, based on the evidence provided by the dissertation, that the SA DOD is not disinterested in KM but just ignorant of the differences between IM and KM. In order to emerge from the information era trenches, the SA DOD requires a comprehensive taxonomy of the various constructs discussed in the dissertation as a starting point, followed by a review of all Level 1 policy and doctrine to correct the dissonance. This will probably result in a realisation as to the importance of KM and that the SA DOD require a KMC and Level 1 KM policy and doctrine to guide the development of the capability.

Much support for the importance of SA DOD KM was expressed in the chapter. Several and varied fundamentals to SA DOD KM was identified in the chapter. Capstone SA DOD knowledge is at least policy, doctrine, intelligence, IP and contracts. A comprehensive knowledge audit may reveal other categories. Other SA DOD knowledge is characterised by the construct of IC; integrating both tacit and explicit knowledge. The time-value of knowledge was identified critical to decisions, actions, effects and advantage.

An SA DOD KM leadership philosophy was proposed and based on the definition of mission command. Knowledge management leadership was identified as the key to a future SA DOD KMC and gave credence to the KM leadership philosophy. Thus, for those that survived and strive to win, they have mastered the art of knowing. To sustain survival and winning; the science of managing that knowledge is paramount. Chapter 6 discussed the adversarial relationship between knowledge continuum security and knowledge sharing and transparency. Fundamental to an SA DOD KMC is knowledge continuum security and the reversal of an adversarial nexus between freedom to share and legislation/policy/doctrine aimed at restricting knowledge flow and usage. Other dilemmas discussed relate to the cost of securing the knowledge continuum and how to embrace technological change without negatively affecting knowledge continuum security. Chapter 6 also suggested the change of SA DOD capability acronyms to reflect the knowledge era constructs – i.e. POSTEFKTB and C^4IKRS, amongst possibly several others.

With the establishment of an SA DOD KMC, the SA DOD should consider developing KW doctrine. This will better facilitate the art of knowing and the science of managing that knowledge to obtain and sustain advantage. Fundamental to an SA DOD KMC is to construct coherence and integration. The level of integration that can be achieved within the SA DOD and between the proposed SA DOD KMC, government agencies such as SITA and Armscor and other RSA governmental departments will have a significant impact on the success of SA DOD KM.

The researcher proposed that the construct of KM be expanded to KCM which would support the continuous requirement for the integrated management of the various components that is considered part of the knowledge continuum. It will also provide a platform for the integration of the various sets of processes involved in the management of the various components.

8.2.7 Chapter 7 - Questionnaire and Analysis

Chapter 7 discuss the findings about the questionnaire on aspects relating to the possible manifestation of KM theory and practice in the SA DOD. The chapter presented an analysis of the questionnaire data and response rate that were distributed to senior SA DOD managers. Critical answers about the assumption that the SA DOD is not interested in KM were sought. The

questionnaire aimed at providing possible answers to all the questions. Sixteen senior management positions were approached for insight in the first round. This sample was extended to include all Senior Management position in the SA DOD (a sample of 275 possible respondents). The sample was expanded for a number of reasons but primarily due to the poor response rate by the initial 16 respondents. Even though the sample was extended significantly, only one additional response was obtained after two rounds of distribution. Chapter 7 aimed at providing answers to SRQs 1, 2, 3 and 4. Secondary research question 1 about the SA DOD interest in KM was answered unsatisfactorily. However, the low rate of response indicates disinterest in KM. Secondary research question 2, 3 and 4 were answered unsatisfactorily due to the low rate of response.

Only two questionnaires were returned, showing a distinct lack of interest in the subject matter and contribution to knowledge development in general and KM in particular. The respondents that did provide some insight confirmed the SA DOD's disinterest in KM. The respondents confirmed the importance of institutionalised SA DOD KM. Because of the limited responses received not much detail can be added to the findings of Chapters 5 and 6 of the dissertation. The chapter was included in the dissertation because of the unambiguous confirmation of the assumption made in SRQ 1, thus also supporting findings of Chapters 5 and 6 of the dissertation. Other than this the questionnaires provided very little robust insight.

8.2.8 Chapter 8 - Conclusions, Contribution and Closure

The final chapter crystallises the findings stemming from Chapters 2-3 and 5-7, as set out in the research methodology (dissertation Chapter 4), concluding the research report with a statement on the contribution of the research and possible related questions for future research.

8.3 CONCLUSIONS

8.3.1 The SA DOD's Perceived Disinterest in Knowledge Management

The opening quote by Naisbitt (1984: 17) - "Drowning in information, but starved for knowledge", is true for the SA DOD and thus the requirement for coherent and integrated KM. The researcher found that some of the primary drivers of the perception of disinterest in KM are based on the SA DOD still being in the information era; manage information as strategic rather than knowledge; capability/resource misunderstanding; KM leadership vacuum; KM policy and doctrine vacuum, and suffering from construct dissonance. Other possible reasons for the perceived disinterest are linked to the SA DOD organisational complexity; making KM from a single point in the organisation extremely difficult taking C2 relationships into consideration. Yet another reason might be linked to security considerations. Possibly the simplest reason for the perceived disinterest is the contentiousness and difficulty of defining knowledge and KM.

Theorists seem to be reasoning mostly that KM is an add-on process to core organisational business strategy. This might be central to the problem of managing organisational knowledge. Questions should be raised regarding the position of knowledge in business/organisational strategy and design. Should knowledge not be the centrepiece around which organisations are constructed, in other words, moving towards a knowledge-based theory of the organisation? In some businesses, notably those that deal with innovation, this is certainly the case. However, in the public domain, the focus will be on service delivery, facilities, hardware and process – not primarily on knowledge

held by the organisation. It is mostly ignored that all these service/product delivery enablers exist due to the knowledge held by the organisation and not the other way around. In militaries, this is certainly the case.

Military organisations are mostly designed around force structures, which are based on threat perceptions and resource-based strategies. Because hindsight is usually considerably clearer and better informed; military organisations will probably look very different from its current design when placing knowledge as the central driver for the delivery of its mandate – rather than hardware. For this to happen, military leadership will have to accept that knowledge is the only strategic asset the military organisation owns; the rest being tactical, operational and strategic consumables. There should thus be a realisation that it is knowledge that is the central driving force for military capability requirements, capability design, capability deployment, capability regeneration/development and advantage. These are normally driven by excellence in intelligence. Others are driven by policy, doctrine and IP – all capstone military knowledge.

In general - hardware, software and humans are placed as the central assets fuelled by financial resources. Knowledge is considered central to development and growth but not as the central strategic asset from which a military capability should be grown.

8.3.2 The Importance of SA DOD Knowledge Management

The researcher found extensive support for the importance of KM for both public and business organisations. The literature review identified several important aspects informing decisions regarding the importance of knowledge and the management thereof for the SA DOD. Knowledge is probably the most important asset organisations own or manage. Knowledge management enhances trust in government and by implication the SA DOD as part of government. Knowledge management enhances military effectiveness, efficiency and economy as well as broader governmental objects such as national competitiveness from an economic perspective. The management of available knowledge is positively correlated to sustainable competitive advantage/military advantage. Knowledge is fundamental to enhanced decision-making, action and effects; thus making the management of knowledge of paramount importance. Knowledge management is positively correlated to innovation and organisational performance (yet difficult to prove). These are both critical success factors for the SA DOD to cope with complexity as well as its legislated responsibility to use fiscal resources optimally. Knowledge management provides the vehicle for organisations to remain relevant, adaptive and to cope with complexity. Knowledge management can be perceived as a military advantage multiplier.

8.3.3 What is Fundamental to SA DOD Knowledge Management

The de-construction of contemporary KM theory and practice in Chapter 2 and 3 of the dissertation and understanding gained from the document analysis in Chapters 5 and 6 of the dissertation provides the grounding for the proposed SA DOD KM leadership philosophy - The art of knowing and the science of managing knowledge to obtain and sustain advantage – see Figure 8.1 for a graphic representation (also reflected as part of Figure 6.10.).

Figure 8.1: Leadership Philosophies

Source: Author's compilation of information.

To survive and win leaders must master the art of knowing. When assuming that just merely surviving is not an option, then fundamental to obtaining and sustaining advantage is the science of managing knowledge. This philosophy incorporates the critical elements present in knowledge and KM. This encompasses people (human- and relational capital), organisation (culture and structural capital), process (business and KM), tools (IT and social constructs) and the objective of survival and advantage.

From the systematic exploration of the body of knowledge about KM and practical application, thereof the researcher proposed SA DOD knowledge and KM definition as follows – *Knowledge is evolving meaning in the form of intellectual capital that capacitate understanding, decision-making, action effect and advantage* (also reflected in Figure 3.12.). The definition for SA DOD KM (below) is closely aligned with the definition above and could thus be associated with an interpretivist approach to knowledge and KM. This positions the future SA DOD KM in third generation KM and aligns it with knowledge era requirements. The researcher did not construct a process-based KM definition because it limits its applicability. The only prescript is for process integration. The proposed definition is as follows – *Knowledge Management is the integrated process transforming organisational intellectual capital into evolving meaning to capacitate understanding, decision-making, action effect and advantage* (also reflected in Figure 3.13.). Figure 8.2 graphically combines the proposed KM definition with the knowledge continuum. The researcher proposes the adoption of a knowledge continuum as the most optimum and possibly most realistic representation of the SA DOD IC. A knowledge continuum enables understanding that knowledge is a dynamic phenomenon that requires flexible, adaptable and responsive approaches to SA DOD IC integration. The importance of system and sensor interaction with the knowledge continuum should not be underestimated.

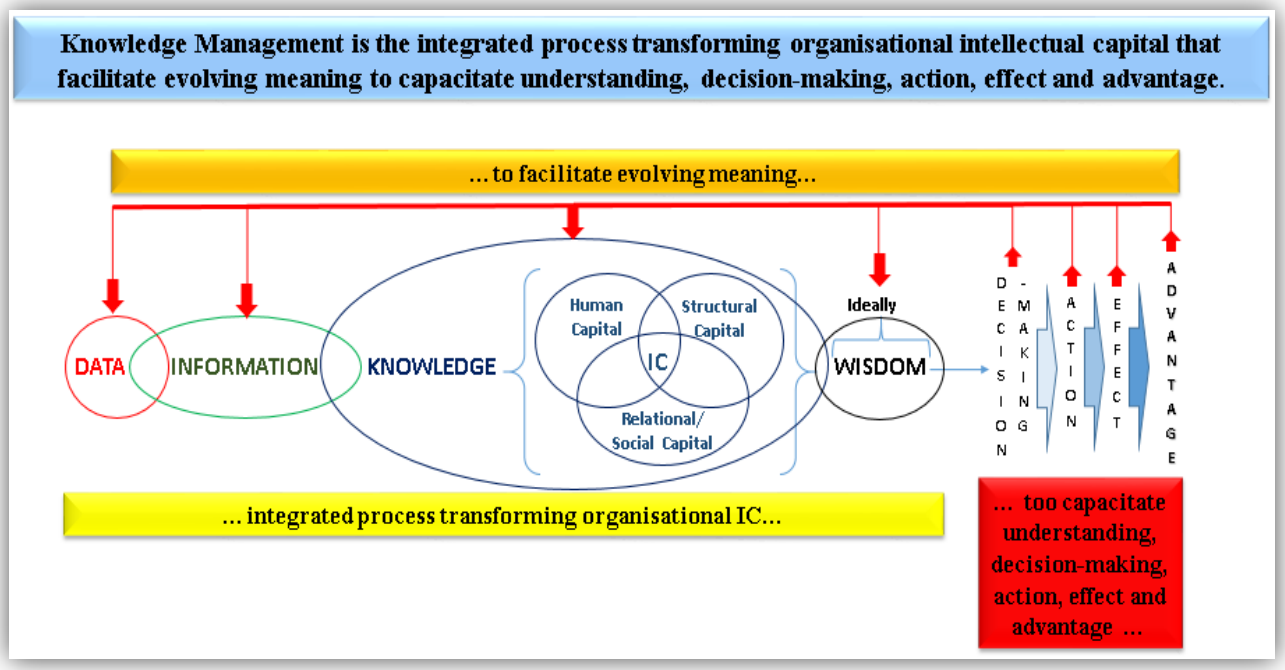


Figure 8.2: Proposed Knowledge Continuum

Source: Author's compilation of information and proposed for SA DOD KMC and KM. Also reflected in Figure 3.17.

Although IT and IM are not KM; these systems and management approaches provide critical material and stability to KM as a capability. Figure 8.3 expresses this graphically.

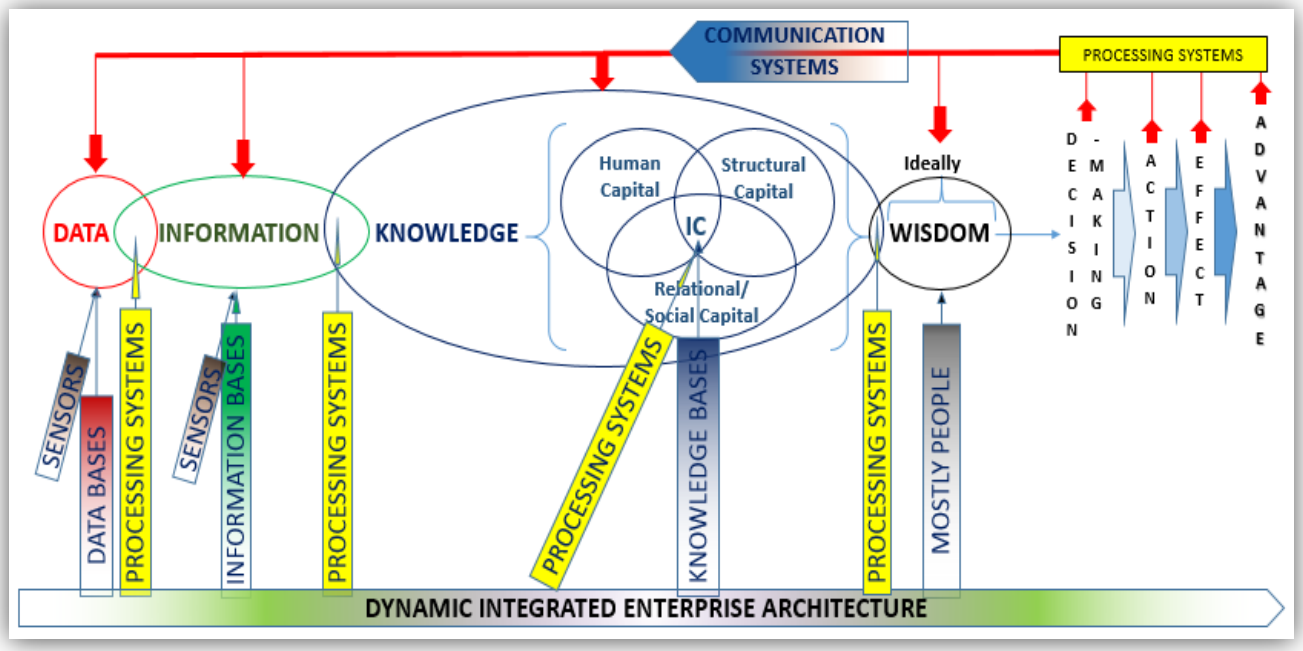


Figure 8.3: Illustration of the Systems and Sensor Interaction with the Proposed Knowledge Continuum

Source: Author's compilation of information and proposed for SA DOD KMC and KM. Also reflected in Figure 6.9.

Knowledge is thé 'war-winning factor' for militaries, i.e. the use of superior IC to dominate the adversary's OODA loop. Data and information are the building blocks (who, what, why, where, when, how, which effects and what thereafter) required for processing to generate capstone military knowledge (policy, doctrine, strategy, intelligence, IP, etc.) that will shape the SA DOD operational environment(s). Figure 8.4 illustrates that the SA DOD decision-making and action cycles should be based on knowledge rather than on data and information for the simple reason that situational awareness and operational action are best based on IC (e.g. intelligence and doctrine) for advantageous decisions, actions and effects. Figure 8.4 (below) for a graphic representation that integrates the various constructs, conceptually.

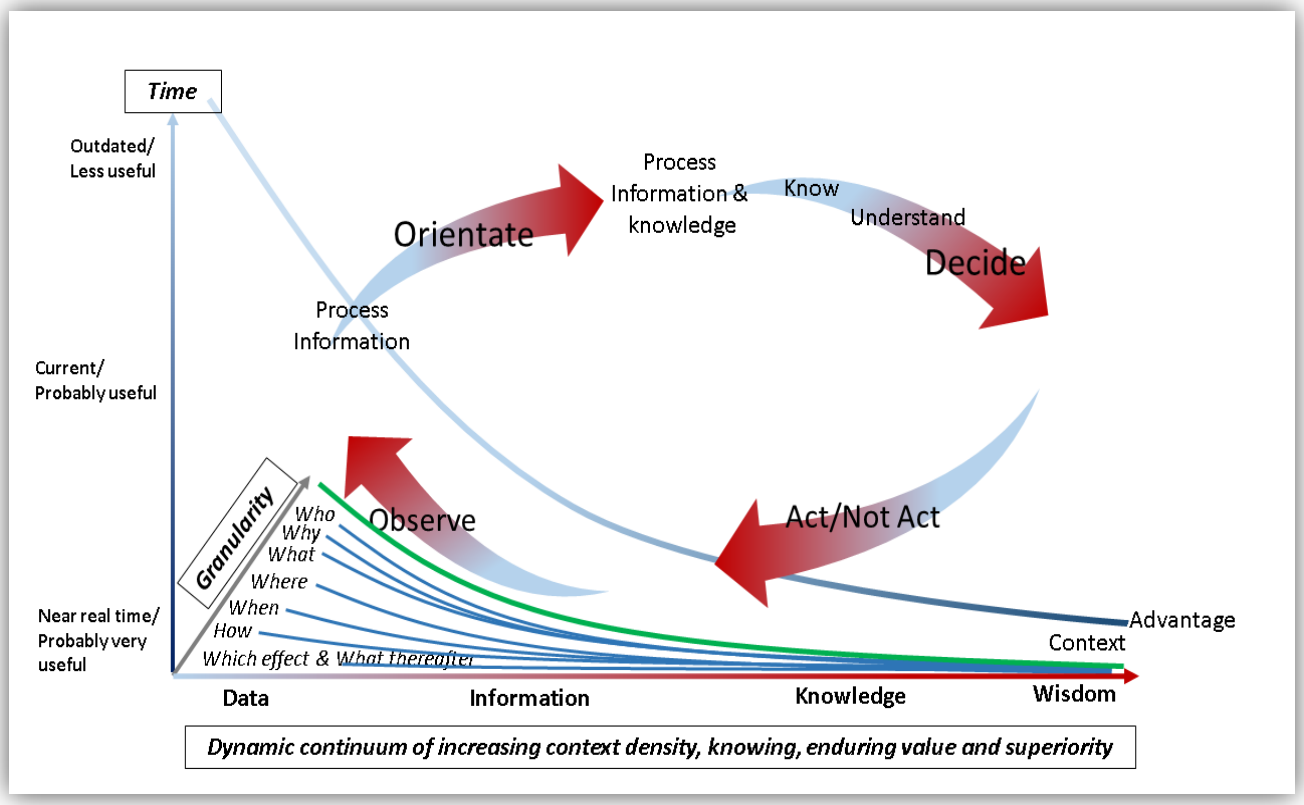


Figure 8.4: Information- and Knowledge-based OODA Loop Superimposed on a Three Axis Time-Granularity-Knowledge Continuum Graphic

Source: Author's compilation of information and proposed for SA DOD KMC and KM. Also reflected in Figure 6.4b.

The SA DOD is a process driven organisation. As such, KM processes can be applied in all knowledge-intensive components/functions of the SA DOD (e.g. HRM, operations, intelligence, force preparation, force provision, logistics, finance, policy and strategy, acquisition and procurement, etc.). The KM processes chosen are inclusive of several of the processes listed by various authors included in the dissertation. For example, 'use' is inclusive of processes such as creation, utilisation, exploit, conversion, generating, experimenting, integrate, collaborate, sharing, develop, distribute, combine etc. Similarly, 'storage' is inclusive of processes such as hold and assembles. Codification is inclusive of processes such a capture, generating, embedding and measuring.

However, as ‘meaning’ change due to environmental changes, new processes might be constructed and/or adopted to cope with this change; processes that might not be described in the proposed definition or that might totally alter the manner in which the organisation function. No matter how the organisation and/or its external environment change, the individuals that constitute the organisation will always require knowledge or ‘evolving meaning’ to understand shifts in contexts in order to make decisions supporting actions and effects. For this certain processes will be relevant and/or new processes will be designed to cope with these changes. Ultimately, the ‘evolving meaning’ or knowledge will be managed in accordance with strategy that will in all probability be directed to achieve competitive advantage or military advantage.

The proposed definition of knowledge supports the construct of knowledge as meaning – i.e. knowledge is more than its collective components (data and information) to the point that it facilitates understanding of the context (who, what, where, when, why, how, which effect and what thereafter) in order to take decisions, actions and gain advantage. The types of knowledge to be managed by the SA DOD are approached from an interpretative approach to facilitate sense-making rather than the commoditisation of knowledge as a commercial artefact.

A critical gap in the literature is the importance of knowledge security. This is a subject that does not attract much academic attention and debate. However, the military environment project a clear requirement for data, information and knowledge (intelligence primarily) security. Protection should occur at the level of data and information because these are the building blocks for knowledge. If the SA DOD can assure adequate protection of the building blocks the integrity of the derived knowledge will be of a much higher quality. SA DOD knowledge should then be afforded higher order protection because this knowledge should provide decision-makers and operational commanders the competitive edge/advantage to control the adversary OODA loop. This requirement is based on the fact that knowledge is derived from data and information that has been subjected to knowledge processes such as understanding, skill, interpretation, insight (amongst others), evolving with the dynamics of the operating environment to capacitate enhanced decisions, actions and effects.

The researcher proposes a broad descriptive KM model consolidating the fundamental aspects of military and related knowledge as identified by the dissertation. The concept is based on a firm foundation and a number of spearheading triangles and pentagrams that simulate progress and leadership. The foundational rectangle is solid in colour and texture indicating the requirement for structural and organisational strength. The triangles and pentagrams are transparent and overlapping to indicate the requirement for coherence and integration.

The KMC vision is based on the mandate of the SA DOD and the ubiquitous requirement for decisions, actions, effects and advantage to serve the national interest. The KM objectives are to provide decision-makers and executers with decision-quality and actionable knowledge.

The KMC should be led by a Chief Knowledge Officer influenced by the proposed KM philosophy of ‘the art of knowing and the science of managing that knowledge to obtain and sustain advantage’. This philosophy should provide inspirational guidance as to the requirement of decision-makers ‘to know’ rather than just being ‘informed’. It also dictates the use of scientific methods to manage the SA DOD knowledge continuum in order to achieve coherence and integration on an enterprise scale.

Core processes and fundamental resources have been included in the model in order to provide a baseline from which flexible solutions can be crafted. The model does not propose any lines of communication or action (i.e. C2 relationships) or feedback loops. The researcher assumes that in a dynamic environment these relationships will change causing instability to the broad perspective of SA DOD KM. These decision-making and process flows can be delineated in detail with future research once a thorough knowledge audit has been completed. It is, however, important to understand from a broad perspective what impact SA DOD KM. The proposed model is graphically presented in Figure 8.5 -

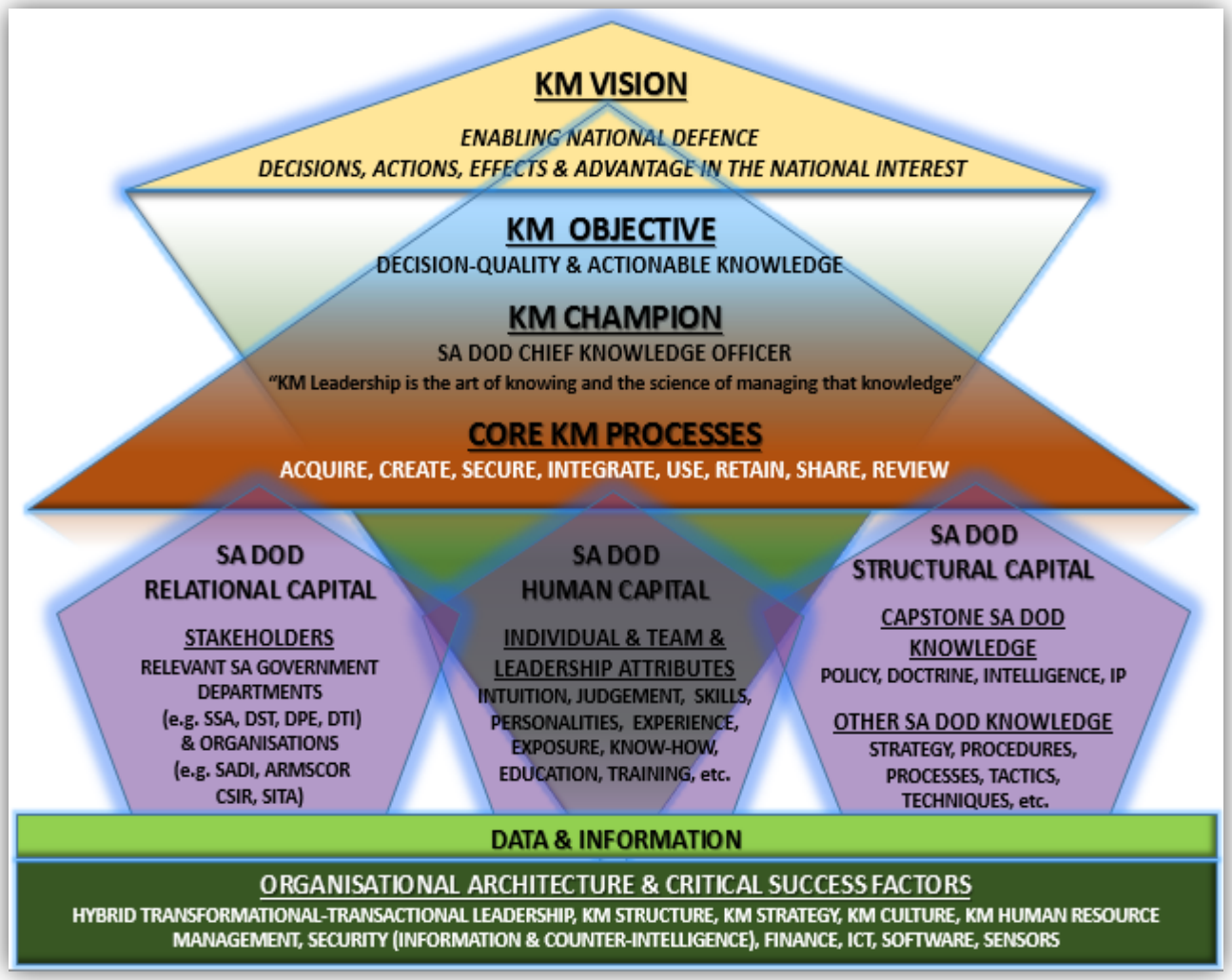


Figure 8.5: Proposed SA DOD Knowledge Management Model

Source: Author's compilation of information and proposed for SA DOD KMC and KM. Also reflected in Figure 6.10.

The pentagrams contain descriptions of the SA DOD IC, which is considered SA DOD knowledge. Internally, the SA DOD should lead, structure, fund and enable (IT) KM initiatives to facilitate decision-making and actions in support of national security and defence interests. This is done through the DR 2015, policy, doctrine, intelligence and IP – implemented through various strategic planning and management processes and resources. These elements of structural capital are developed and managed by people that contribute human capital to achieve this and facilitate the crafting of relational capital.

Once these are in place and practised, it should be understood that the SA DOD IC is impacted by the external environment. Key role-players are the SA government (national policy and legislation – e.g. the IPR act); SA Defence Industry (a key military knowledge developer and manager), ARMSCOR (the sole contractor for SA military matériel knowledge described by SA DOD policy), CSIR (the key research institute generating and managing military knowledge and SITA (the sole software development and management agent for the SA government and thus the SA military). The external environment will have its own KM models with which it manages SA DOD relevant knowledge. If not, the SA DOD can minimise its risk by taking cognisance of possible vacuums in the external environment and mitigating that risk by constructing mechanisms within its own organisational and structural IC to make sure SA DOD owned IC is managed accordingly.

SA DOD IC is supported by the various and several types of data and information managed by the SA DOD with core KM processes but also more specific processes tailored to the requirements. The proposed conceptual SA DOD KM model is supported by the proposed definitions for SA DOD knowledge and KM and a KM leadership philosophy.

Thus, based on the various elements and proposals above, the SA DOD will be able to formulate SA DOD policy and craft strategy with which to manage knowledge as a strategic asset. SA DOD policy and doctrine should guide and elaborate on the external and internal environments, management principles, operational and warfare thinking, responsibilities, methods, resources and CSFs (amongst other things), in order to approach KM in a structured and process-driven manner.

8.4 CONTRIBUTIONS

8.4.1 Implications for Theory

Published military KM academic research is very limited. Most documents are research on applied organisational documentation, e.g. those published by the USA military. SA DOD KM and KMC do not exist, resulting in the continued entrenchment of information era practices and associated thinking. The dissertation reiterates that the SA DOD should adopt knowledge era practices and associated thinking in order to cope with complexity and to enhance the ability to extract dynamic meaning from the knowledge continuum in order to enhance understanding and positively augment the SA DOD decision-making capacity, actions, accuracy of effects and propensity to gain and sustain advantage. The dissertation proposes that these elements are the primary purpose of a KMC and KM. This can be rolled out to virtually any organisation because of the universality of the constructs.

The dissertation provides insight into issues that drives disinterest in KM by the SA DOD; which might be the case for other governmental organisations in the RSA and further afield. The dissertation provides arguments supporting the importance of the establishment of an SA DOD KMC and institutionalising coherent and integrated KM. This dissertation represents seminal research on what should constitute SA DOD knowledge, the SA DOD knowledge continuum; and what can be considered fundamental to the establishment of an SA DOD KMC as well as coherent, integrated KM.

The dissertation expands on the construct of a knowledge continuum rather than a knowledge hierarchy. This paradigm shift is extended into the construct of KCM as the next step of integration required to manage the proposed SA DOD knowledge continuum and once an SA DOD KMC has been established. These proposals are broadly applicable for organisations that seek to maximise advantages inherent in the organisational knowledge continuum.

The dissertation proposes a KM leadership philosophy to parallel and reinforce the requirements of the mission command construct, extending the thinking to the longstanding OODA loop construct. The dissertation highlights a specific void in the body of knowledge on knowledge security or security as a CSF for KM (and not just focus on information security or IT systems related security); whilst highlighting the importance thereof for the SA DOD and militaries in general.

The dissertation highlights the requirement for new applied thinking regarding constructs such as KW, the continental staff system in the knowledge era and military capability expressions such as C^4IKRS and for the SA DOD, POSTEFKTB. The dissertation also constitutes a method for KM research in all RSA governmental departments. The fact that there is an RSA legislative requirement for a CIO in each governmental department makes further consideration of this dissertation by other government departments very relevant in order to introduce the importance of coherent and integrated KM into extant legislation and align it with knowledge era thinking and practices.

8.4.2 Implications for Practice

The proposed SA DOD KM leadership philosophy, definition for knowledge, KM definition and KM model could be used to inform the appointment of SA DOD KM champion as well as the development of an SA DOD KMC, policy, doctrine, structure, strategy and implementation plan. This should be done at the strategic, operational and tactical levels of the SA DOD. The research calls for the development of a detailed and authoritative taxonomy on the constructs involved in KM to ensure total clarity and integration of SA DOD Level 1 policy and doctrine on these constructs.

SA DOD Level 1 policy and doctrine are capstone knowledge documents. This level of policy provides an opportunity to capture and manage lessons learned (a primary source of organisational knowledge) for each of the SA DOD knowledge portfolios (e.g. HRM, defence materiel, intelligence, finance, operations, doctrine, etc.). Lessons learnt can be included in the first part of SA DOD Level 1 policy and doctrine, before or after Changes to Existing Policy. This would then not only provide context to the changes required but also provide an expanding historical growth path for institutional learning. The same can be achieved with a lessons learnt chapter in each of the various SANDF doctrine documents. Both these proposals will fill the gap on Lessons Learnt management within the SA DOD and SANDF by means of institutionalising the management thereof within policy and doctrine documents. It enables better coherence and integration with other knowledge sources due to cross-referencing between various policies and doctrines. It also reinforces the idea of a ‘learning organisation’ which is central to KM.

The research should significantly inform the next iteration of the SA DOD Defence Review, and with interactive consultation between various role-players could possibly have an impact on the

implementation and review cycle of the extant DR 2015. The findings and proposals made by this dissertation could be empirically tested for strategic fit by other government departments because of the proposed definitions alignment with survival, performance and advantage. The KM model proposed can be adapted and extended to suit most organisational environments. Because of the similarities among militaries worldwide, the findings and proposals made by this dissertation could be empirically tested for fit by other militaries.

8.5 FUTURE RESEARCH

Further research is recommended for the establishment of an SA DOD KMC and institutionalisation of KM. Empirical validation of the proposed definitions and SA DOD KM model could follow.

Further research on the portfolios of knowledge in the SA DOD; possibly within the context of the IC framework and how these relate to each other in terms of content; IT enablers involved and from a C2 perspective. Such research should provide valuable insight as to the readiness of the SA DOD for KM. Such research could be based on the approach followed by Bartczak and England (2005) used by USA Air Force Material Command. Benchmarking could also provide considerable insight into planning and implementation issues. These issues will inform further research about the operationalisations of an SA DOD KMC. Other research that will enhance more comprehensive KM could include research about the integration of the Military Veterans KM with that of the SA DOD. This could be separate or combined with research on SA DOD KMC operationalisation.

Interesting future research might be conducted on the complexities and modalities of differentiating between SA DOD databases, information-bases and knowledge-bases in order to better manage the content that would support decisions, actions, effects and advantage. This could be included in the research about SA DOD knowledge portfolios suggested above, or could be a separate initiative.

In terms of general military theory development, research is recommended on what the principles of war would be in the knowledge era; will these remain the same? If not, what should be adapted and/or added? More research could be undertaken, based on discussions in Chapter 5 and 6 of the dissertation, about introducing a KM staff component in the continental staff system.

Future researchers might consider investigating military concepts that require review for applicability in the knowledge era, for example, C^4I^3RS and how this would impact for example the continental staff system and other operational concepts and organisational architecture.

The researcher proposes that the construct of KM be expanded to KCM, which would support the continuous requirement for the integrated management of the various components that are considered part of the knowledge continuum. The construct of KCM is posited to provide a platform for the integration of the various sets of processes involved in the management of the various components. Future research may involve the exact nature of the proposed construct of KCM. Just from these possible future research areas, it is quite clear that the SA DOD has only noticed the tip of the ‘KM’ iceberg. The next step would be to get close enough to start scratching.

8.6 CLOSURE

Knowledge is real, it is ubiquitous, it is continuously evolving and it is here to stay. Knowledge will shape the future land-, sea-, air- and cyberscapes of every social sphere and battles to come. Knowledge should be managed as a matter of survival, firstly, and then to obtain and sustain advantage. Knowledge should be managed by militaries with the next war or peace operation in mind, whilst learning from the past and adapting the current. Knowledge left unmanaged will render investment in IC and other resources inefficient, wasteful and without advantage. With winning as the ultimate objective, knowledge should be leveraged by designing and implementing specific policies, capabilities and processes within specific organisational parameters. The SA DOD can now embark on this journey by stepping through this opened door into the knowledge era.

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SELECTED SAMPLE OF SA DOD LEVEL 1 POLICY AND DOCTRINE

The following documents were filtered from the 9519 policy documents contained in the docs-folder of the pp_static dated 17 May 2016. The selection is based on the sample criteria discussed in chapter 6 of the dissertation. The first column provide a unique configuration number used in chapter 6 to simplify referencing. The differences amongst these documents and there relative status is elaborated on in the introduction of Chapter 6 of the dissertation.

Table R1: Selected Sample of SA DOD Level 1 Department of Defence Instructions and Doctrine

Study Configuration No	Policy Name	Type of Document	SA DOD File Reference
DODD1	Parking Facilities Policy (Excluding Vessels and Aircraft) in the Department of Defence LOG/00004/2005	DODD	DS/CLOG/D FAC/R/401/1/3/P
DODD2	South African Military Health Service's Health Care Delivery SG/00001/2004 01 OCTOBER 2011	DODD	DS/SG/R/104/10/2/ P
DODD3	Transformation Management in the DOD PERS/00008/2006 NOVEMBER 2008	DODD	CHR/CDTM/106/3 0/1/P
DODD4	Management of Records in the Department of Defence DODD/CMI/00008/2008	DODD	DS/CMIS/R/514/2/ P
DODD5	Promotion and Implementation of Batho Phele Principles in the Department of Defence POL&PLAN/00015/2005 MARCH 2006	DODD	DS/POL&PLAN/R /501/13/P
DODD6	Official Donations and Sponsorships To and by the Department of Defence POL & PLAN/ 00005/2003 MARCH 2006	DODD	DS/CPP/R/403/3/P
DODD7	The Inclusion of Qualifying Legal Dependants on the Medical Strength of a Member of the Department of Defence POL&PLAN/00019/2005 JUNE 2007	DODD	DS/CHR/CDHRSD &P/DHRSS/R/104/ 16/1/P
DODD8	Implementation of the Anti-Personnel Mines Prohibition Act (Act No 36 of 2003) DODD/POL&PLAN/ 00013/2004 01 JANUARY 2006	DODD	DS/CPP/R/331/2/3/ P
DODD9	Financial Misconduct Management in the DOD DODD/FIN/00005/2003 (EDITION 1) DECEMBER 2006	DODD	DS/CFO/R/505/17/ 6/P
DODD10	Information and Communications Systems Security in the DOD DODD/CMIS/00003/2006	DODD	CMIS/R/516/4/7/P
DODD11	Distance Learning in the Department of Defence TRG/00002/2005	DODD	DS/TRG/R/103/1/P
DODD12	The Management of the Separation of Officials From the Department of Defence POL & PLAN/00025/2005	DODD	DS/CDHRSD&P/D HRSS/R/107/2/P

DODD13	on the Health Classification and Deployability of SANDF Members With HIV and Aids DODD/SG/00006/2009	DODD	SG/R/104/11/6/9/P
DODD14	Management of Public Service Act Personnel (PSAP) Probationers in the Department of Defence DODD/POL&PLAN/00030/2008	DODD	DS/HR/R/102/19/P
DODD15	Electronic Mail in the Department of Defence CMI/00010/2008	DODD	DS/CMI/R/516/12/P
DODD16	Acting Allowance for Members/Employees in the Department of Defence POL&PLAN/00026/2005 APRIL 2008	DODD	DS/CDHRSD&P/DHRSS/R/104/5/P
DODD17	Department of Defence Labour and Service Relations Policy PERS/00005/2005 OCTOBER 2007	DODD	DS/PERS/R/104/29/P
DODD18	Management of Recognition of Prior Learning in the Department of Defence DODD/TRG/00004/2005 AUGUST 2005	DODD	DS/TRG/R/103/1/P
DODD19	Use of Cellular Telephones within the Department of Defence CMI/00011/2008	DODD	DS/CMIS/R/318/1/P
DODSPF1	Department of Defence Strategic Planning Framework 8 APRIL 2012		
DODI1	Policy on Corporate Communication in the Department of Defence CCS NO 00003/2008 (OLD) DODI/00167 (EDITION 1) (NEW)	DODI	CCS/DCC/R/511/4/P
DODI2	Policy on Parking Facilities (Excluding Vessels and Aircraft) in the Department of Defence LOG NO 00054/2005 (EDITION 1)	DODI	DS/CLOG/DFAC/R/401/1/3/P
DODI3	Policy on Distance Learning (DL) in the Department of Defence TRG NO 00012/2005 (EDITION 1)	DODI	DS/HR/R/103/1/P
DODI4	Policy on Transformation Management in the DOD PERS NO 00038/2006 (EDITION NO 1)	DODI	CHR/CDTM/R/106/30/1/P
DODI5	Policy for the Use of Cellular Telephones within the Department of Defence CMI/00005/2000 (EDITION 2)	DODI	CMIS DIV/R/318/1/P
DODI6	Policy on Management of Public Service Act Personnel (PSAP) Probationers in the Department of Defence POL&PLAN/00051/2001 (EDITION 1)	DODI	DS/HR/R/102/19/P
DODI7	Policy on Acting Allowance for Members/Employees in the Department of Defence POL&PLAN 00100/2005 (EDITION 1)	DODI	DS/CDHRSD&P/DHRSS/R/104/5/P
DODI8	Policy on the Middle Management Service Remuneration System in the Department of Defence POL&PLAN 00098/2005 (EDITION 1)	DODI	DS/CDHRSD&P/DHRSS/R/104/1/P

DODI9	Policy on the Management of Records in the Department of Defence DODI/CMI/00013/2002 (EDITION 1)	DODI	DS/CMIS/R/514/2/P
DODI10	Policy for the Management of Incapacity (Poor Work Performance) of Public Service Act Personnel (PSAP) (Including Senior Management Service (SMS) Members in the Department of Defence PERS/00041/2007(EDITION 1)	DODI	DS/PERS/R/104/29/P
DODI11	Policy on Leave of Absence for Public Service Act Personnel (PSAP) in the Department of Defence POL AND PLAN NO 00036/2001 (EDITION 2)	DODI	DS/CDHRPP/DHRSS/R/104/14/P
DODI12	Policy on Promotion and Implementation of Batho Pele Principles in the Department of Defence POL AND PLAN NO 00092/2005 (EDITION 1)	DODI	DS/CPP/R/501/13/P
DODI13	The Management of Career Development of Personnel Appointed in Terms of the Public Service Act within the Department of Defence PERS NO 00031/2004 (EDITION 1)	DODI	DS/C HR/CD HRM/DCD (PSAP)/R/501/15/P
DODI14	Policy on the Management of Recognition of Prior Learning (RPL) by Education, Training and Development (ETD) Providers in the Department of Defence TRG NO 00013/2005 (EDITION 1)	DODI	DS/TRG/R/103/1/P
DODI15	Policy on Contract Management and Administration for Obtaining Qualifications and Attending Education, Training and Development (ETD) Opportunities at State Expense POL AND PLAN NO 00030/2000 (EDITION 2)	DODI	DS/CPP/R/103/10/P DS/CPP/R/103/11/P
DODI16	Department of Defence Instruction on the Overarching Policy for Education, Training and Development (ETD) in the Department of Defence TRG/00004/2001 (EDITION 1)	DODI	DS/TRG/R/103/1/P
DODI17	Department of Defence Policy on Official Donations and Sponsorships To and by the DOD POL AND PLAN NO 00081/2003 (EDITION 1)	DODI	DS/CPP/R/403/3/P
DODI18	Policy on Transfer Payments by the Department of Defence FIN NO 00023/2002 (EDITION 2)	DODI	DS/CFO/DIR BUD/R/504/4/5/P
DODI19	Department of Defence Policy on General Education and Training (GET), Inclusive of Adult Basic Education and Training (ABET),	DODI	DS/CHR/HRD/R/103/1/58/P

	and Further Education and Training (FET) TRG/00009/2003 (EDITION 2)		
DODI20	Department of Defence Policy on Education, Training and Development (ETD) of Public Service Act Personnel (PSAP) TRG/00001/1999 (EDITION 3)	DODI	DS/CHR/HRD/R/103/1/P
DODI21	Policy on the Management of Debtor Accounts within the Department of Defence FIN NO 00020/2000 (OLD) DODI/00042 (EDITION 2) (NEW)	DODI	DS/CFO/R/505/13/13/P
DODI22	Policy, Process and Procedures for Macro Structure Management POL AND PLAN NO 00089/2004 (EDITION 1)	DODI	DS/DPSP/R/502/1/P
DODI23	Policy on the Management of Defence Intangible Capital Assets DODI/00027/2014 (EDITION 1)	DODI	DS/DMD/R/518/3/1
DODI24	Policy, Process and Procedures for Software Asset Management DODI/00162/2013 (EDITION 1)	DODI	CMIS DIV/R/516/1/P
DODI25	Religious Policy of the Department of Defence CPLN GEN NO 00001/1999 (EDITION 2)	DODI	CPLN GEN/R/104/15/P
DODI26	Policy, Process and Procedures for Business Process Management in the Department of Defence DODI/POL & PLAN/00096/2005 (EDITION 1)	DODI	DS/DPSP/CDSM/DIMS/R/503/6/P
DODI27	Policy on Internal Audit, Inspection and Antifraud in the Department of Defence IG/00002/2001 (EDITION 2)	DODI	DS/IG/R/503/2/15/P
DODI28	Policy, Process and Procedures for the Management of Ergonomics in the Department of Defence SG/00014/2002 (OLD) DODI/00092 (EDITION 1) (NEW)	DODI	DS/SG/R/402/10/P
DODI29	Policy, Process and Procedures for the Implementation of Defence Policy on Insensitive Munitions LOG NO 00018/2005 (OLD) DODI/00147 (EDITION 2) (NEW)	DODI	DS/LOG/R/402/1/36/P
DODI30	Policy on the Conduct of Counter Intelligence INT NO/00012/2004 (OLD DODI/00132 (EDITION 1) (NEW)	DODI	DS/DI/R/202/1/P
DODI31	Policy on Defence Against Chemical and Biological Weapons and Radioactive Materials SG NO 00002/1999 (OLD) DODI/00018 (EDITION 4) (NEW)	DODI	DS/SG/R/306/3/P
DODI32	Policy on the Management of Supplier Payroll Deductions in the Department of Defence	DODI	DS/CFO/R/104/2/3/P

	FIN NO 00027/2003 (OLD) DODI/00124 (EDITION 1) (NEW)		
DODI33	Establishment of South African Military Assistance and Training Teams (SAMATT) STRAT PLAN NO 00003/2007 (EDITION 1)	DODI	DS/CPSP/R/103/1/P
DODI34	Policy on the Management of Separation of Officials from the Department of Defence POL & PLAN NO 00099/2005 (EDITION 1)	DODI	DS/CDHRSD&P/DHRSS/R/107/2/P
DODI35	Policy on the Inclusion of Qualifying Legal Dependants on the Medical Strength of a Member of the Department of Defence POL AND PLAN NO 00094/2005 (EDITION 1)	DODI	DS/CHR/CDHRSD&P/DHRSS/R/104/16/1/P
DODI36	Policy on Training Assistance to/from Other State Departments, Public and Private Organisations in the RSA TRG/00011/2005 (EDITION 1)	DODI	DS/J TRG/R/103/7/P
DODI37	Department of Defence Policy on the Implementation of the Anti-Personnel Mines Prohibition Act (Act No 36 of 2003) POL AND PLAN NO 00090/2004 (EDITION 1)	DODI	DS/CPP/R/331/2/3/P
DODI38	Policy, Process and Procedures for Cash Management in the Department of Defence FIN NO 00030/2004 (EDITION 1)	DODI	DS/CFO/R/505/17/7/P
DODI39	Policy on the Regulation of the Department of Defence Intranet Service DODI/00122/2013 (EDITION 2)	DODI	DS/DDS/CMISD/R/516/4/7/P
DODI40	Policy, Process and Procedure for the Acquisition of Armaments in the Department ACQ NO 00005/2003 (EDITION 3)	DODI	DS/ACQ/R/302/6/P
DODI41	Policy on Financial Misconduct Management in the Department of Defence FIN/00024/2002 (EDITION 2)	DODI	DS/CFO/R/505/17/6/P
DODI42	Policy, Process and Procedures for Risk Management in the Department of Defence DODI/00099/2013 (EDITION 2)	DODI	DOD/DPSP/R/501/18/P
DODI43	Senior Management Service in the Department of Defence POL AND PLAN NO 00065/2002 (EDITION 2)	DODI	DS/CPP/R/104/1/P
DODI44	Policy, Process and Procedures for Promotional, Commemorative and Motivational Items in the Department of Defence DODI/POL & PLAN/00032/2000 (EDITION 2)	DODI	CCS/DCC/R/511/1/P
DODI45	Policy on Alternative Service Delivery in the Department of Defence ACQ/00003/2000 (EDITION 4)	DODI	DS/HDSCI/R/401/16/P
DODI46	Policy on Aerial Photography	DODI	DS/DI/R/202/1/7/P

	INT NO/00005/2000 (OLD) DODI/00052 (EDITION 2) (NEW)		
DODI47	Policy, Process and Procedures on the Requisition, Issuing, Handling and Safeguarding of Face Value Documents in the Department of Defence FIN NO 00005/2000 (OLD) DODI/00036 (EDITION 2) (NEW)	DODI	DS/CFO/DFSS/R/505/7/P
DODI48	Policy on the DOD's Interaction With Auditor-General South Africa (AGSA) and Standing Committee on Public Accounts (SCOPA) FIN NO 00004/2000 (OLD) DODI/00035 (EDITION 3) (NEW)	DODI	DS/CFO/R/505/1/3/2/P
DODI49	Policy, Process and Procedures for the Management of Guest Speakers TRG NO 00002/2000 (EDITION 2)	DODI	CHR/CD HRD/R/103/6/P
DODI50	Policy on the Disclosure of Defence Information POL & PLAN NO/00022/1999 (EDITION 2)	DODI	DS/DI/R/202/1/7/1/P
DODI51	Policy, Processes and Procedures for Budget Control in the Department of Defence DODI/00017/2013 (EDITION 5)	DODI	DOD/CFO/DBC/R/505/17/P
DODI52	Policy on Domestic Subsistence and Travel Dispensation for Officials in the Department of Defence PERS NO 00006/1999 (EDITION 2)	DODI	CHR/CDHRSD&P/DHRSS/R/104/6/P
DODI53	Policy, Process and Procedures for the Development, Promulgation and Maintenance of Departmental Level Policy in the Department of Defence POL AND PLAN NO 00008/1999 (EDITION 3)	DODI	DS/CDPSP/R/501/15/P
DODI54	Policy on the Reporting of Incidents in the Department of Defence FIN/00026/2003 (EDITION 1)	DODI	DS/CFO/R/501/8/6/P
DODI55	Department of Defence Policy on Foreign Relations Gifts POL AND PLAN NO 00061/2001 (EDITION 1)	DODI	DS/CPP/R/403/3/P
DODI56	Management of Learner Assessment by Providers in the DOD TRG NO 00006/2003 (EDITION 2)	DODI	DS/CJ TRG/R/103/1/P
DODI57	Policy, Process and Procedures on Information and Communications Systems Security in the Department of Defence DODI/CMI/00008/2001 (EDITION 4)	DODI	CMIS/R/516/4/7/P
DODI58	Policy on South African Military Health Service's Health Care Delivery SG NO 00018/2003 (OLD) DODI/00116 (EDITION 1) (NEW)	DODI	
DODI59	Policy on Resettlement within the Borders of	DODI	CHR/CDHRSD&P

	the Republic of South Africa For Officials of the Department of Defence POL AND PLAN NO 00070/2002 (OLD) DODI/00097 (EDITION 1) (NEW)		/DHRSS/R/104/6/P
DODI60	Policy on Electronic Mail in the Department of Defence CMIS/00011/2001 (Old) DODI/00071 (New) (EDITION 3)	DODI	DOD/C CMIS/R/516/12/P
DODI61	Policy on the Utilisation and Regulation of Consultants within the Department of Defence POL & PLAN/00046/2001 (Old) DODI/00068 (New) (EDITION 2)	DODI	DS/DSCI/R/401/16 /P
ERMF1	Enterprise Risk Management Framework DRM/FRW/01/09		CDPSP/CDSM/R/5 01/18/P
FMDI1	Policy on the Management of the Bank Account of the Department of Defence (the Paymaster-General Sub-Account) and Registration of Suppliers Banking Details (Level 2) Instruction FMDI NO 0002/2007 (EDITION 2)	FMDI	DS/CFO/R/505/13/ 13/P
IDODI1	Interim Department of Defence Instruction on the Use of Social Media in the Department of Defence CCS NO/00001/2011 (EDITION 1)	IDODI	CCS/DCC/R/511/4 /P
IDODI2	Policy on the Reporting of Performance Information Against Plan POL&PLAN/00001/2011 (EDITION 1)	IDODI	DS/CDPSP/R/501/ 8/P
JDP1	Process and Procedures on South African Military Health Service's Health Care Delivery SG NO 00002/2003 (EDITION 1)	JDP	DS/SG/R/104/10/2/ P
JDP2	Process and Procedures Regarding Resettlement within the Borders of the Republic of South Africa For Officials of the Department of Defence POL AND PLAN NO 00020/2004 (EDITION 1)	JDP	CHR/CDHRSD&P /DHRSS/R/104/6/P
JDP3	Processes and Procedures for the Practice of Distance Learning (DL) in the Department of Defence TRG NO 0006/2005 (EDITION 1)	JDP	DS/TRG/R/103/1/P
JDP4	Process and Procedures For Transformation Management in the DOD PERS NO 00026/2006 (EDITION 1)	JDP	CHR/CDTM/106/3 0/1/P
JDP5	Process and Procedures for the Use of Cellular Telephones within Department of Defence CMI/00010/2008 (EDITION 1)	JDP	CMIS/R/318/1/P
JDP6	Process and Procedures on the Management of Public Service Act Personnel (PSAP) Probationers in the Department of Defence POL&PLAN/00035/2006 (EDITION 1)	JDP	DS/HR/R/102/19/P
JDP7	Process and Procedures for the Management	JDP	DS/CDHRSD&P/D

	of the Acting Allowance in the Department of Defence POL AND PLAN NO 00033/2005 (EDITION 1)		HRSS/R/104/5/P
JDP8	Process and Procedures for the Middle Management Service Remuneration System in the Department of Defence POL&PLAN/00031/2005 (EDITION 1)	JDP	DS/CDHRSD&P/DHRSS/R/104/1/P
JDP9	Principles, Processes and Procedures for the Management of Records in the Department of Defence JDP/CMI/00004/2004 (EDITION 1)	JDP	DS/CMIS/R/514/2/P
JDP10	Process and Procedures for the Management of Incapacity (Poor Work Performance) of Public Service Act Personnel (PSAP) Including Senior Management Service (SMA) Members in the Department of Defence PERS/00024/2006 (EDITION 1)	JDP	DS/PERS/R/104/29/P
JDP11	Process and Procedures for Leave of Absence for Public Service Act Personnel in the Department of Defence POL AND PLAN NO 00013/2004 (EDITION 1)	JDP	DS/CDHRPP/DHRSS/R/104/14/P
JDP12	Process and Procedures for the Promotion and Implementation of Batho Pele Principles in the Department of Defence POL AND PLAN NO 00029/2005 (EDITION 1)	JDP	DS/CPP/R/501/13/P
JDP13	Process and Procedures for the Management of Career Development for Personnel Appointed in Terms of the Public Service Act within the Department of Defence PERS NO 00002/2004 (EDITION 1)	JDP	DS/C HR/CD HRM/DCD (PSAP)/R/501/15/P
JDP14	Process and Procedures for the Implementation of Recognition of Prior Learning (RPL) by Education, Training and Development (ETD) Providers in the Department of Defence TRG NO 00004/2004 (EDITION 1)	JDP	DS/TRG/R/103/1/P
JDP15	Process and Procedures for Contract Management and Administration for Obtaining Qualifications and Attending Education, Training and Development (ETD) Opportunities at State Expense POL AND PLAN NO 00007/2003 (EDITION 1)	JDP	DS/CPP/R/103/10/P DS/CPP/R/103/11/P
JDP16	Overarching Process and Procedures for Education, Training and Development (ETD) in the Department of Defence TRG/00003/2004 (EDITION 1)	JDP	DS/TRG/R/103/1/P
JDP17	Process and Procedures for the Management of Official Donations and Sponsorships To and by the	JDP	DS/CPP/R/403/3/P

	DOD POL AND PLAN 00004/2003 (EDITION 1)		
JDP18	Process and Procedures for Transfer Payments by the Department of Defence FIN NO 00008/2003 (EDITION 2)	JDP	DS/CFO/DIR BUD/R/504/4/5/P
JDP19	Department of Defence Process and Procedures for General Education and Training (GET), Inclusive of Adult Basic Education and Training (ABET), and Further Education and Training (FET) TRG/00002/2003 (EDITION 2)	JDP	DS/CHR/HRD/R/103/1/58/P
JDP20	Department of Defence Process and Procedures for Education, Training and Development (ETD) of Public Service Act Personnel (PSAP) TRG/00001/2003 (EDITION 2)	JDP	DS/C HR/HRD/R/103/1/P
JWM1	Joint Maritime Helicopter Operations 417	JWM	DS/OPS/DIV HQ/R/305/1/P
JWP1	Doctrine for Corporate Communication in Operations JWP 116	JWP	CCS/DCC/R/305/1/P
JWP2	Process and Procedures for the Parking Facilities (Excluding Vessels and Aircraft) in the Department of Defence LOG NO 00019/2005 (EDITION 1)	JWP	CLOG/DFAC/R/401/1/3/P
JWP3	Process and Procedures for the Management of the Separation of Officials From POL AND PLAN NO 00032/2005 (EDITION 1)	JWP	DS/CDHRSD&P/DHRSS/R/107/2/P
JWP4	Defence Doctrine (Issue 2) JWP 137	JWP	DS/OPS/DIV HQ/R/305/1/P
JWP5	African Battlespace JWP 139	JWP	DS/OPS/DIV HQ/R/305/1/P
JWP6	Planning at the Military Strategic Level JWP 132	JWP	DS/OPS/DIV HQ/R/305/1/P
JWP7	Fire Support Coordination During Conventional Operations JWP 105 (PART 8)	JWP	DS/OPS/DIV HQ/R/305/1/P
JWP8	Peace Support Operations JWP 106 PART 2	JWP	None
SANDFD1	Development, Promulgation and Maintenance of Level 1 Policy in the South African National Defence Force STRAT & PLAN/00001/2007 MARCH 2007	SANDFD	CDSP/R/501/15/P
SANDFD2	Development, Promulgation and Maintenance of Joint Doctrine in the SANDF SANDFD/OPS/00001/2007	SANDFD	DS/OPS/DIVHQ/R/305/1/P
SANDFD3	The South African National Defence Force Military Strategy STRAT & PLAN/00002/2007 September 2008	SANDFD	CDSP/R/303/1/P
SANDFO1	Policy on the South African National	SANDFO	CDSP/R/303/1/P

	Defence Force Military Strategy STRAT & PLAN NO 00002/2007 (EDITION 1)		
SANDFO2	Policy, Process and Procedures for the Fire and Rescue Service System in the South African National Defence Force LOG/00001/2010 (EDITION 1)	SANDFO	C LOG/DESS/ R/401/8/P
SANDFO3	Policy on Frequency Spectrum Management in the South African National Defence Force CMIS/00002/2010 (EDITION 1)	SANDFO	DS/CMIS/R/516/4/ 7/P
SANDFO4	Development, Promulgation and Maintenance of Joint Doctrine in the SANDF SANDF ORDER/OPS/00001/2007	SANDFO	JOPS DIV/R/305/1/P
SANDFO5	Policy, Process and Procedures on the Development, Promulgation and Maintenance of Level 1 Policy in the South African National Defence Force STRAT & PLAN NO 00001/2007 (EDITION 2)	SANDFO	CDSP/R/501/15/P
SANDFO6	Policy on Combat Net Interoperability Standard for the South African National Defence Force CMIS 00001/2008 (EDITION 1)	SANDFO	CMIS/R/318/13/P
SANDFP1	Process and Procedures for the Implementation of the Combat Net Interoperability Standard in the South African National Defence Force CMIS NO 00001/2008 (EDITION 1)	SANDFP	CMIS/R/318/13/P
SANDFP2	Development, Promulgation and Maintenance of Joint Doctrine in the SANDF OPS NO/0001/2007 (EDITION 1)	SANDFP	CJOPS/R/305/1
SANDFP3	The South African National Defence Force Military Strategy STRAT & PLAN NO 00002/2007 (EDITION 1)	SANDFP	CDSP/R/303/1/P
SANDFP4	Process and Procedures for the Development, Promulgation and Maintenance of Level 1 Policy Publications in the South African National Defence Force STRAT & PLAN NO 00001/2007 (EDITION 1)	SANDFP	CDSP/R/501/15/P

APPENDIX A: KNOWLEDGE MANAGEMENT FUNDAMENTALS

The following tables have been adapted from Al-Hakin & Hassan (2011: 953-954); Al-Hakin & Hassan (2011: 953-954) and Črnjar & Dlačić (2014: 979) and expanded with support and views of other academics. Collectively they provide evidence from literature on the core KM infrastructure components and processes for successful KM. It provides academic support to the proposed SA DOD KM model and core processes. These infrastructure components are also closely associated with KM CSF. Both KM infrastructure and CSF are discussed in Chapter 2 of the dissertation and referred to in context throughout the dissertation.

Table A: KM Infrastructure Critical Success Factors

Influence	Dimension/Infrastructure	Supported
Managerial	Organizational strategy (mostly related to the balancing of organisational capability, time and goals for the future)	Probst, 1998; Uit Beijerse, 1999; Skyrme, 2000; Grover & Davenport, 2001; Chourides, *et al*., 2003; Wong & Aspinwall, 2005; Yeh, *et al*., 2006; La Grange, 2006; Al-Mabrouk, 2006; Zaim, Tatoglu, Zaim, 2007; Riempp & Smolnik, 2007; Wei, *et al*., 2006, 2009; Zheng, *et al*., 2010; Hassan & AL-Hakim, 2011; Zieba & Zieba, 2014
	Leadership (mostly related to the long term vision and style of management)	Probst, 1998; Uit Beijerse, 1999; Seemann, *et al*., 2000; Choi, 2000; Skyrme, 2000; Nonaka, *et al*. , 2000; Stankosky & Baldanza, 2001; Baldanza, 2001; Nemati, 2002; Girard, 2004; Hung, 2005; Wong & Aspinwall, 2005; Yeh, *et al*., 2006; La Grange, 2006; Asoh, *et al*., 2007; Slagter, 2007; Riempp & Smolnik, 2007; Hassan & AL-Hakim, 2011; Anand & Singh, 2011; Berraies, *et al*., 2014; Zieba & Zieba, 2014
	Coordination and control Organisational adjustments	Holsapple & Joshi, 2000; La Grange, 2006; Črnjar & Dlačić, 2014 Anand & Singh, 2011
	Organizational learning	Holsapple & Joshi, 2000; Skyrme, 2000; Stankosky & Baldanza, 2001; Lee & Choi, 2003; Slagter, 2007; Lin & Kuo, 2007; Rhodes, *et al*., 2008; Berraies, *et al*., 2014; Zieba & Zieba, 2014

	Organizational structure (mostly related to organization type and design)	Probst, 1998; Baldanza, 2001; Stankosky & Baldanza, 2001; Grover & Davenport, 2001; Gold, *et al*., 2001; Nemati, 2002; Chuang, 2004; Hung, 2005; Chong, 2006; Wei, *et al*., 2006, Zaim, Tatoglu, Zaim, 2007; Lee & Lee, 2007; Slagter, 2007; 2009; Akhavan, *et al*., 2009; Zheng, *et al*., 2010; Hassan & AL-Hakim, 2011; Yadav & Singh, 2013; Zieba & Zieba, 2014
	Organizational culture (mostly related to the method of knowledge creation, sharing as affected by trust, leadership, collaboration, learning and incentives or rewards)	Grant, 1996a and b; Probst, 1998; Uit Beijerse, 1999; Chait, 2000; Skyrme, 2000; Grover & Davenport, 2001; Gold, *et al*., 2001; Nemati, 2002; Hung, *et al*., 2003; Girard (2004); Chuang, 2004; Hung, 2005; Wong & Aspinwall, 2005; Chong, 2006; Al-Mabrouk, 2006; Yeh, *et al*., 2006; Zaim, Tatoglu, Zaim 2007;Lee & Lee, 2007; Slagter, 2007; Asoh, *et al*., 2007; Riempp & Smolnik, 2007; Rhodes, *et al*., 2008; Zheng, *et al*., 2010; Ling & Shan, 2010.; Hassan & AL-Hakim, 2011; Anand & Singh, 2011; Yadav & Singh, 2013; Berraies, *et al*., 2014; Zieba & Zieba, 2014
	Security (the protection of knowledge and KM infrastructure)	La Grange, 2006; Zaim, Taloglu & Zaim, 2007; Darby, 2013, Yadav & Singh, 2013; Shajera & Ahmed, 2015
	Measurement (related to the impact of knowledge on the performance of the organisations)	Probst, 1998; Holsapple & Joshi, 2000;
Resource	Human Resource/ IC Management	Akhavan , *et al*., 2009; Al-Mabrouk, 2006; Seemann, *et al*., 2000; Choi, 2000; Chourides, *et al*., 2003, Chuang, 2004; Hung, 2005; Wong & Aspinwall, 2005; La Grange, 2006; Chong, 2006; Zaim, Tatoglu, Zaim, 2007; Lee & Lee, 2007; Lin & Kuo, 2007; Ling & Shan, 2010; Yadav & Singh, 2013; Zieba & Zieba, 2014
	Information Technology implementation (also referred to as systems in other literature and is mostly related to technology)	Uit Beijerse, 1999; Skyrme, 2000; Choi, 2000; Tiwana, 2000; Carneiro, 2000; Grover & Davenport, 2001; Gold, *et al*., 2001; Stankosky & Baldanza, 2001; Nemati, 2002; Chourides, *et al*., 2003; Lee & Choi, 2003; Kakabadse, *et al*., 2003; Girard, 2004; Chuang, 2004; Hung, 2005; Wong & Aspinwall, 2005; Al- Mabrouk, 2006; Yeh, *et al*., 2006; La Grange, 2006; Chong, 2006; Zaim, Tatoglu, Zaim, 2007; Lee & Lee, 2007; Riempp & Smolnik, 2007; Asoh, *et al*., 2007; Rhodes, *et al*., 2008; Ling & Shan, 2010; Anand & Singh, 2011; Yadav & Singh, 2013; Berraies, *et al*., 2014; Zieba & Zieba, 2014

	Finance	Črnjar & Dlačić, 2014; Zieba & Zieba, 2014
Environmental	Culture, government	La Grange, 2006; Črnjar & Dlačić, 2014

APPENDIX B: QUESTIONNAIRE

Chapter 4 outlines the research methodology for the dissertation. A primary research tool is questionnaires with open-ended questions. The following is an example of the consent agreement completed by each respondent:

UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvennoot • your knowledge partner

CONSENT TO PARTICIPATE IN RESEARCH

KNOWLEDGE MANAGEMENT IN THE SOUTH AFRICAN DEPARTMENT OF DEFENCE

You are asked to participate in a research study conducted by CAPT (SAN) A. P. PUTTER, from the FACULTY OF MILITARY SCIENCE (MILITARY ACADEMY) at Stellenbosch University. THE RESULTS OF THIS RESEARCH WILL BE CONTRIBUTED TO A RESEARCH PAPER. You were selected as a possible participant in this study because OF THE DEPARTMENTAL POSITION HELD, INFLUENCE ON DECISION-MAKING AND EXPERT KNOWLEDGE ON DEPARTMENTAL MATTERS.

1. **PURPOSE OF THE DISSERTATION**

THE PURPOSE OF THE DISSERTATION IS TO -

- DETERMINE THE STATE AND IMPORTANCE OF KNOWLEDGE MANAGEMENT (KM) FOR THE SOUTH AFRICAN DEPARTMENT OF DEFENCE (SA DOD).
- TO FILL THE KNOWLEDGE GAP ON KM WITHIN/RELEVANT TOO THE SA DOD.

THE RESEARCH SHOULD ENABLE THE CONSTRUCTION OF KM THEORY AND/OR A MODEL (NEW OR HYBRID) TAILORED FOR SA DOD KM REQUIREMENTS TOO MAXIMISING THE OUTPUT OF A FUTURE STRATEGICALLY DIRECTED KM PROGRAMME WITHIN THE AMBIT OF THE DEFENCE REVIEW 2014.

2. **PROCEDURES**

If you volunteer to participate in this study, we would ask you to do the following things:
PARTICIPATE IN A PERSONAL INTERVIEW THAT WILL USE OPEN ENDED (DISCUSSION) TYPE QUESTIONS ENQUIRING ABOUT YOUR ORGANISATIONAL BACKGROUND AND KNOWLEDGE MANAGEMENT RELATED QUESTIONS.

3. **POTENTIAL RISKS AND DISCOMFORTS**

THERE ARE NO FORESEEN RISKS OR DISCOMFORTS ATTACHED TO THIS RESEARCH.

4. **POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY**

THIS RESEARCH IS NOT CURRENTLY ATTEMPTED IN THE SA DOD THUS LEAVING THE SA DOD WITH A STRATEGIC MANAGEMENT GAP – KNOWLEDGE MANAGEMENT. DUE TO THE VAST PORTFOLIO OF KNOWLEDGE HELD WITHIN THE SA DOD AND GENERATED ANNUALLY IT IS IMPORTANT FOR THE SA DOD TO START UNDERSTANDING WHY AND HOW KNOWLEDGE COULD BE MANAGED.

5. PAYMENT FOR PARTICIPATION

THERE IS NO PAYMENT ATTACHED TO THIS INTERVIEW.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of PASSWORD PROTECTED ELECTRONIC DOCUMENTS.

THE INTERVIEW WILL BE RECORDED TO ENSURE ACCURATE TRANSCRIPTION. THE INTERVIEWEE HAS THE RIGHT TO REVIEW THE RECORDING, EDIT THE RECORDING. THE RECORDING WILL BE ERASED ONCE THE INTERVIEW HAS BEEN TRANSCRIBED AND MEMBER-CHECKED. PUBLISHED FINDINGS FROM THE INTERVIEWS ARE ANONYMOUS OR QUOTED WITH PERMISSION OF THE INTERVIEWEE.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact CAPT (SAN) A. P. PUTTER at 0842074558.

9. RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study. If you have questions regarding your rights as a research participant, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to _____ by CAPT (SAN) A. P. PUTTER in ENGLISH and _____ in command of this language. _____ were given the opportunity to ask questions and these questions were answered to *his/her* satisfaction.

_____ *hereby consent voluntarily to participate in this study/I hereby consent that the subject/participant may participate in this study. I have been given a copy of this form.*

_____

Name of Subject/Participant

NOT APPLICABLE

Name of Legal Representative (if applicable)

_____ _____

Signature of Participant **Date**

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____. _____ was encouraged and given ample time to ask me any questions. This conversation was conducted in ENGLISH and *no translator was used.*

_____ _____

Signature of Investigator **Date**

The following are an outlay of the questionnaire:

QUESTIONS

Secondary Research Question 1: Why is the SA DOD not interested in KM?

- In your opinion or to your knowledge is there interest KM and evidence thereof in the SA DOD in?
- Do you and/or your direct superior's Performance Agreement have a distinct Performance Requirements Statement for KM?
- Are you aware of or to your knowledge is there any SA DOD policy, strategy or doctrine that express on or govern KM?
- Are you aware of or to your knowledge is KM a RSA legislated requirement?
- Are you aware of or to your knowledge is KM addressed in the DR 2015?

Secondary Research Question 2: Why should the SA DOD be interested?

- To the best of your knowledge what do you understand knowledge to be?
- In which era is the world currently in your opinion or to your knowledge?
- In your opinion or to your knowledge, is the DOD a complex organisation?
- In your opinion or to your knowledge, will the quality of decision-making, action, effects achieved and advantage be affected if these activities are based on data vs information vs knowledge?
- In your opinion or to your knowledge, is data and/or information and/or knowledge strategic to the DOD?
- In your opinion or to your knowledge, should the SA DOD engage in KM initiatives?

Secondary Research Question 3: What type of knowledge should the SA DOD be managing?

- In your opinion or to your knowledge what type of knowledge should the SA DOD be managing?
- What knowledge do you manage specifically within your portfolio?

Secondary Research Question 4: How should the SA DOD manage its knowledge?

- In your opinion or to your knowledge, what should the aim/goal/objective of KM be in the SA DOD?
- In your opinion or to your knowledge, what KM processes exists in your domain?
- In your opinion or to your knowledge, is there a requirement for more knowledge integration?
- In your opinion or to your knowledge, what do you think should be key components be of an SA DOD KM model?